The Builder.

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"Abbot's Leigh," near Hayward's Heath.—Mr. F. C. Lees, Architect ..... *Single-Page Photo-Litho.*
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Bath Stone.

THE literature relating to Bath stone is a large one, but it, for the most part, consists of (1) information derived second-hand from persons interested in the material from a commercial point of view; (2) articles resulting from a personal visit to two or three quarries only by those who, judging from their remarks, were too much struck by the novelty of the surroundings to pay any attention to their practical aspects, and whose writings, even in journals devoted to building, are mere eulogisms of the proprietor of the quarry, of the "mighty Titans" underground, and the fungi on the wooden roof props, not unmixed with expressions of relief after being below for a few hours at once more finding themselves in the open air; (3) pseudo-scientific observations based mainly on reports referring to the stone as quarried between fifty and sixty years ago and published in the "Report with reference to the Selection of Stone for building the New Houses of Parliament (1839)"; (4) *réchauffé* editions of out-of-date stone merchants' circulars; (5) essays by geologists not acquainted with the qualifications of stone for building purposes and written from a purely scientific standpoint, useful enough in their own sphere, but of no value to the architect; and (6) "crushing weights," coefficients of elasticity, ratios of absorption, specific gravities and chemical analyses made by very competent men, but on specimens of the stone "kindly" *sent to them* by stone merchants.

The result of all this is that in spite of the fact that no building-stone in the United Kingdom is used so extensively as that from the neighbourhood of Bath, the material is very imperfectly understood by the architectural profession. Probably no stone ever raised has been subjected to such sweeping adverse criticisms in regard to its quality, and it would be difficult to find one which has thrived so well on them. It has always been regarded as the "jerry" builders' stone *par excellence*, cheap, easily tooled, effective; and yet how little does some of it deserve the opprobrium. That there is bad and worthless Bath-stone, and that it is used in immense quantities, we freely admit; but precisely the same might be said of almost any other kind raised over such a wide area. Indeed, it would be very remarkable were this not the case, for a stone of uniformly good quality over several square miles of area is unknown in Nature. To a certain extent the discredit attaching to it is due to the several quarry-masters concerned, who, in times gone by, made no sufficient distinction between the several kinds, so that varieties raised many miles from the city, and which ought to be known by other local names, are all denominated "Bath stone." The indiscriminate manner in which the stone from widely-separated areas was generally supplied for the erection of a single building could not but mislead architects as to the nature of the material for specific purposes. At the same time, we cannot shut our eyes to the fact that architects, as a body, have taken no pains whatever to discover the real sources of origin of the divers kinds, and have not exercised much discretion in their selection. So long as this apathy exists we cannot hope for improvement. We go so far as to say that barely one architect in fifty, having ordered a certain kind of Bath stone, ever knows whether he gets that, or some other kind. It is all very well to state that the material has been ordered from a reliable firm; we do not desire for a single moment to cast any aspersions on Bath stone merchants, or their agents, as a class—we would say the same of those dealing in any other kind of stone; the architect should, on general grounds, be in a position to distinguish the material he orders. The genuine quarry master whose invoice faithfully records the class of stone sent does not fear an inquiry; he knows of the existence of agents, and those hanging on the fringe of the trade, who do not scruple to sell their stone under any name convenient for the moment—he is only too glad to assist in unearthing them.*

The following observations are the result of an exhaustive inquiry on the spot, supplemented by research in the laboratory. Save in a few unimportant cases we have visited every quarry, to the number of forty-eight, in the district. In most instances the thicknesses of the various beds were measured, whilst seventy-three samples of stone were collected for future study. Of these latter, fifty have been selected for detailed experiment, in order to ascertain certain physical properties having a practical bearing from the architect's point of view, and fifty-two thin sections were cut therefrom for examination under the microscope, as described on a former occasion.

The Stone-Producing Areas.

The large district drawn upon in exploiting Bath stone may be judged from the accompanying sketch-map (fig. 1), for the particulars on which we are entirely responsible, except in so far as the geological boundary-lines and railways are concerned. These latter are inserted from the official geological map of the district. The position of each quarry (in the sense presently to be defined) is marked thereon, from our own observations. It will be noticed that the workings are situated near Corsham, and between that village and Box, at Hartham Park, Monk's Park, Kingsdown, Monkton Farleigh, Bradford-on-Avon, Westwood, Winsley, Limpley Stoke, Bathampton, Coombe Down, and Odd Down. The most important local areas are the Box-Corsham, Monk's Park, and Farleigh groups. The Monk's Park and Hartham quarries are farthest from Bath, being about nine miles distant to the north-east; those at Bradford-on-Avon and Westwood are about six miles from the city in a south-easterly direction. It is noteworthy that no large workings are open to the north of the London railway line, except in the Box-Corsham-Hartham areas; and none are found to the west of Bath. The whole of the stone-producing areas may be divided into two parts: one to the south, south-east, and east of Bath, occupying an area of about sixteen square miles; the other, to the north-east, having an area of about nine square miles; so that Bath stone is raised over a district comprised within twenty-five square miles.

Geological Position.

A glance at the map (fig. 1) suffices to show that all the quarries are situated in the geological formation known as the Great or Bath Oolite, a member of the Jurassic series which also yields good building-stones in the southern part of the Cotswolds, to the

* At one quarry in the Bath area, in answer to an inquiry as to what the stone raised there was usually called in the market, we were informed—"Anything; all Bath stones are so much alike that architects cannot tell one from another. We have sometimes called it Portland when builders require that stone."

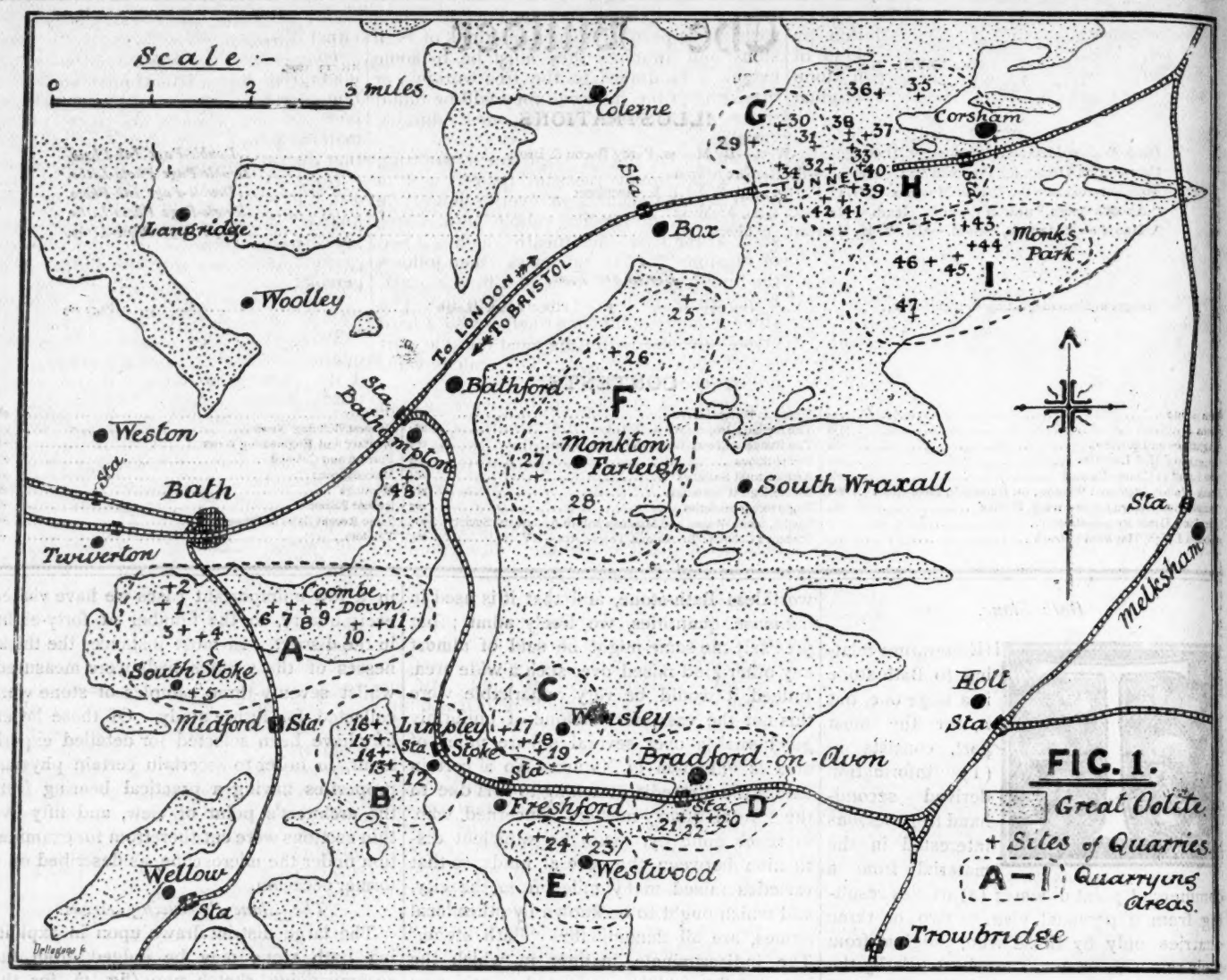

FIG. 1.—*Map showing the Stone-Producing Areas, and Sites of all Bath Stone Quarries.*

north of the area depicted on the map. It will also be noticed that enormous outcrops of that formation occur, on which no important quarries are situated. On the main mass, north of Bradford-on-Avon, and beyond South Wraxhall, it seems tolerably clear that enormous quantities of stone exist. On the hills to the south of Limpley Stoke, the formation is also well represented. The large tracts to the north, near Langridge and Colerne, however, would have to be studied in more minute detail than has hitherto been done to prove the existence of anything like extensive beds of good building-stone there. It may be taken for granted that there is enough stone "in sight" at the various quarries to last for many years to come, and there is nothing from a geological point of view, likely to arise to interfere with the workings. The sites for new quarries will have to be largely controlled by the proximity or otherwise of easy carriage.

The Quarries.

For convenience sake we have divided the Bath district into several areas, the designations of which correspond as nearly as may be with the names usually borne by the different kinds of stone in the market. They are indicated on the map (fig. 1), and are as follow:—

A—Bath area (Odd Down and Coombe Down stone).

B—Limpley Stoke area (Stoke ground stone).

C—Winsley area (Winsley ground stone).

D—Bradford-on-Avon area.

E—Westwood area (Westwood ground stone).

F—Monkton Farleigh area (Farleigh Down stone, Kingsdown).

G—Box area (Box ground stone).

H—Corsham area (Corsham Down, Corngrit, and Hartham Park stones).

I—Monk's Park area (Monk's Park, Ridge Corsham, and Park Lane stones).

In going round the workings we were met with a difficulty at the outset as to what should constitute a separate quarry. With the exception of those on Odd Down, the majority on Coombe Down, those at Winsley, and one in the Box area, all the workings are underground, and should therefore be called stone-mines. Many of these mines are close together, and communicate with each other underground. The difficulty was to define the limits of each mine. Nearly all have several distinct headings; a number of these constitute a "quarry." The method we have adopted is to give each quarry or separate mine a distinctive number, and the various headings examined are distinguished by adding a letter. For example, No. 30 denotes the Clift quarry at Box Hill, and points 30^a, 30^b, 30^c, 30^d, 30^e indicate separate headings visited in that quarry.

A.—*Bath Area.*

Starting from Bath, and passing by a large disused quarry *en route*, we arrive on Odd Down, at

Quarry No. 1.—An open working showing 6 ft. of overburden and 12 ft. of building stone in eight beds. Sample No. 1 was obtained from the third bed from the top of the latter series; it is of a brownish yellow colour, and composed of fragments of shelly matter and oolitic granules bound together by a hard crystalline matrix, the latter forming a large proportion of the stone. The oolitic granules are not so crystalline as the matrix, and are more absorbent. It would appear as though they were much decomposed, and many are reduced to mere nuclei between which and the matrix is a free, porous space. The vertical joints in the quarry are very irregular, and the stone generally is much broken up, but large blocks are here and there seen. We observed one which measured 5 ft. 11 in. by 3 ft. 3 in. by 2 ft. 11 in. Although raised on Odd Down the material is known in the market as Coombe Down stone.

Quarry No. 2.—A very small open working, not differing materially from No. 1.

Quarry No. 3.—An open working with about 3 ft. of tile-like rubble overbearing, and 9 ft. of rather rough-looking stone, with very few regular beds, and much cut up by jointing.

Quarry, No. 4.—Another small open working with 6 ft. of overburden, and 20 ft. of building-stone running in thick beds. Large blocks were obtainable, but many were much discoloured. There was a small "clay gully" penetrating the stone, from the surface of the ground, to which some of the discolouration is due.

Quarry No. 5.—An unimportant working at South Stoke.

Quarry No. 6.—A large open working on Coombe Down, from which enormous quantities of stone were evidently abstracted in former days. It is in the form of a long, sinuous wall stretching for several hundred yards. At a point now being worked we measured the following section (fig. 2):—

Sample No. 6, obtained from a point indicated in the above section may be readily distinguished by its lighter tint, somewhat finer grain, more open texture, and by not having so much shelly matter. It seems to take a sharp arris. In the quarry it appears to be clean, and to possess minute cracks filled with calcite, which render it sounder than would otherwise be the case. The bed called "bastard" stone is peculiar; it contains what the quarrymen call "cockles;" we examined a number of these, expecting, from the description, to find the remains of fossil mollusca, or corals. They were, however, mere cavities, lined in some cases by fine crystals of calcite, and no doubt origin-

ally contained fossils which have since been decomposed, and removed in solution by water. We state this to show the kind of action to which the Coombe Down stone has been subjected, by which its original

FIG. 2.

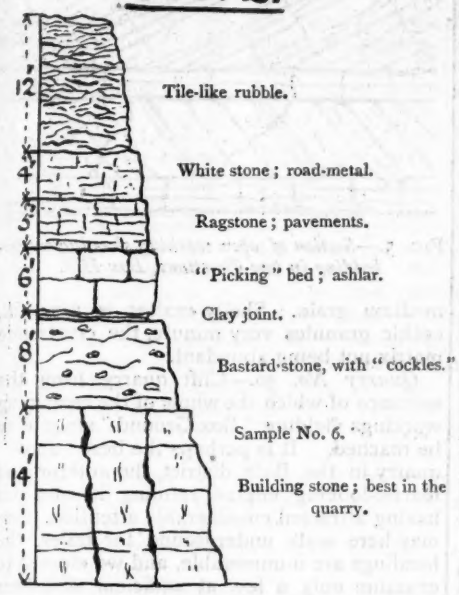

FIG. 2.—*Section in a Quarry on Coombe Down, near Bath.*

character has become much modified. Continuing along the face of this quarry we noticed a species of wedge-bedding, a phenomenon illustrated in fig. 5, though the latter refers to another working. We ascertained that the false-bedding, or wedge-bedding did not affect the quality of the stone in any way.

Quarry No. 7.—An open working known as Prior Park quarry, consisting of 8 ft. of rubble, 8 ft. of useless stone in four beds, two of which are much iron-stained, beneath which is a variable thickness of building stone, from 4 ft. to 7 ft. deep. The quality of the stone is not bad, but the joints are rather close together, and only small blocks could be obtained at the time of our visit. The lower portion is slightly false-bedded. The stone is of a yellowish-brown tint, compact, with many shells, and several earthy oolitic granules.

Quarry No. 8.—Small open working, with 7 ft. of overburden, and 7 ft. of building-stone. The latter are in very thin beds, six being exposed, vertical joints irregular, so that only small blocks were procurable. It is lighter in tint than that from No. 7 quarry, and contains a number of small porous cavities, which immediately distinguishes it from others.

Quarry No. 9.—An open working, with 3 ft. of overburden, and 10 ft. to 11 ft. of building-stone, in rather thick beds for Coombe Down stone. One measured 2 ft. 9 in. on the bed. This is much used as sawn ashlar, and the blocks present a peculiar appearance. Over the face of the stone, as will be seen in the following sketch (fig. 3), a number of veins

FIG. 3.

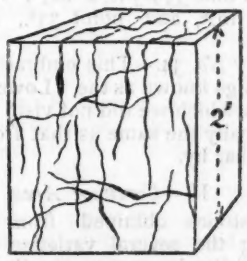

FIG. 3.—*Block of Coombe Down stone, showing minute calcite veins.*

of calcite make their appearance. The width of some of these was as much as 1 mm., and by using a lens, extremely minute ones, and very close together, were observable. This structure is peculiar to certain kinds of Bath stone, and although they must be, to some extent, a hindrance to the free working, or masoning of the material, they will be found to be characteristic of the most durable varieties.

Quarry No. 10.—A large open working, known as Mount Pleasant quarry, with a considerable thickness of overburden, made up of 16 ft. of tile-like rubble with coarse stone at the base, underneath which is a bed of ragstone 7 ft. in thickness; then follows the building-stone in beds of 4 ft. 6 in., 2 ft. 6 in., 4ft.*, 10 in., 11 in., and 9 in. The stone is finely oolitic and shelly, with a hard crystalline matrix, but its most durable part is the shell constituent. Thin calcite veins are frequent.

Quarry No. 11.—Part of this working is in the open, and part underground; it is the only stone mine on Coombe Down. The section in the heading showed four beds, having the following thicknesses respectively: 3 ft.*, 3 ft. 6 in.*, 4 ft. 6 in.*, and 2 ft. 6 in. The stone is fine-grained, and mainly composed of minute oolitic granules.

B.—*Limpley Stoke Area.*

All the workings in this area are mines. They are situated near the summit of a hill above the village of Limpley Stoke, the material for the most part being carted to the railway station near at hand. All the sections visited showed but one bed of building-stone, known in the market as "Stoke Ground."

Quarry No. 12.—Thickness of bed 5 ft. 9 in.* The stone is of a brownish cream tint, medium-fine grain, not very uniform, and compact. It is composed of rather earthy oolitic granules, with occasional large pieces of shells bound together by an abundant calcite matrix. The last-mentioned is the most characteristic and distinguishing feature in the Stoke ground stones, which are all very homogeneous in tint and appearance.

Quarry No. 13.—The section here shows a bed 6 ft. 3 in.* in thickness. The oolitic granules are slightly more earthy.

Quarry No. 14.—This communicates underground with the last-mentioned working. The building-stone bed is 7 ft. 6 in.* in thickness. It is locally harder than any other in the area, a phenomenon produced by the occurrence of small concretionary patches, in the vicinity of which the whole stone seems to be better in quality than elsewhere. It is probably the most durable of the stones in the Stoke area. In walking underground we noticed two faults which seem to have been a considerable hindrance in the working. The following diagram (fig. 4) shows the effect. A section of the

FIG. 4.

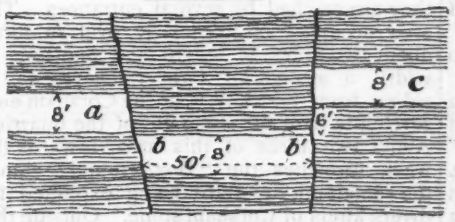

FIG. 4.—*Section in Quarry No.* 14, *showing faults.*

a, *b*, *c* = Galleries from which stone has been removed.

stone, at *b*, about 50 ft. in length, after having been dislocated has dropped about 8 ft. from the gallery at *a*, whilst the continuation at *c* has been elevated about 6 ft., at least, that is the net result of the movement. It was not difficult for the quarrymen in *a* to find *b*, but it must have required some tact, after arriving at the wall b^1, where the stone suddenly gave out, to ascertain the whereabouts of the continuation at *c*. They were, no doubt, facilitated by the soft ferruginous earth filling up the fault, which permitted of tolerably easy access in either direction.

Quarry No. 15.—Situated farther along underground, in a lateral prolongation of the faulted mass B, shown in fig. 4. The stone is 8 ft.* in thickness, and does not differ materially from that last described, except that the small concretions are missing.

Quarry No. 16.—Thickness of bed, 7 ft. 6 in.*; stone similar to that from last quarry. At the point of junction with the bed below (not used) numerous small cavities exist, doubtless due to the action of percolating water.

C.—*Winsley Area.*

This is the least important of the stone-quarrying areas in the Bath district. Were it not that the material raised is warmer in tint than other kinds, and that certain architects have a preference for it in consequence, it is probable that the quarries would be closed. The amount of overburden to be removed before the stone is obtainable, together with the circumstance that the workable beds are only about 5 ft. to 6 ft. in thickness, render the exploitation of the "Winsley Ground" stone a rather costly affair, and this is no doubt responsible for its being so little used. Yet in former times enormous quantities must have been raised thereabouts, and many buildings erected of Bath stone from fifty to a hundred years since derived the material from the old Murhill quarries, a visit to which is instructive as showing old methods of working.

Quarry No. 17.—The old Murhill workings referred to. The quarries, which form a long open face, have about 20 ft. of overburden, beneath which are two beds of building-stone, 3 ft. and 2 ft. in thickness respectively. The face is interesting as showing the old method of quarrying with picks, instead of one-handled saws. The material appears to have been mostly sent away by canal, for the remains of old-fashioned rails down an inclined plane to the waterway which runs along the side of the hill, may yet be seen. Hard by is a small abandoned stone mine, at a lower level.

Quarry No. 18.—A small open working, showing 20 ft. of overburden, mainly composed of rubble, brown clay, and ragstone, beneath which are two beds of freestone 3 ft. 5 in.*, and 2 ft. in thickness respectively. The stone, both in this and the next quarry to be described, was much iron-stained, and appeared to require careful selection. It is a yellowish-brown, fine-grained shelly oolite, the granules being the least crystalline portion of the stone. Its deep colour at once distinguishes it from other Bath stones.

Quarry No. 19.—Very close to the last-mentioned, and the section and stone are similar. The ragstone has many "cockles" and cavities in it, and might do for burning into lime.

D.—*Bradford-on-Avon Area.*

Although raised in larger quantities than at Winsley, the stone is of more interest locally than from a general standpoint, inasmuch as it is chiefly used in the immediate vicinity of the town.

Quarry No. 20.—This is the largest working in the area, and is known as Woodside quarry, close to the canal. The freestone beds are of variable thickness, measuring in the aggregate from 10 ft. to 15 ft., the roof and floor being of ragstone. The material itself is a light cream-coloured oolite, uniform in grain, and not very fossiliferous.

Quarries Nos. 21 *and* 22.—Mines known as Poulton quarries, both very small, the material being used locally.

E.—*Westwood Area.*

The workings in this area are mines of great size. In some respects the disposition of the stone is very remarkable. One may walk for long distances underground and find that the stone does not vary more than an inch or two in thickness the whole way. With few exceptions, presently to be noted,

* An asterisk following the thickness of a bed denotes that a sample which may, or may not, be described, although carefully examined, was obtained from that bed

it is in one bed only, which is about 8 ft. in thickness, but occasionally it "heaves" in the middle—*i.e.*, a weak plane is developed along which the stone has a tendency to split. The most curious point, however, is that the vertical joints are very far apart—in some instances 20 yds. to 25 yds. We were told, and are quite prepared to believe it, that in these quarries gangs of men work for months on one large block of stone before coming upon any joints. The softness of the material in the quarry enables it to be readily cut, otherwise the absence of joints would render it very difficult to get.

Quarry No. 23.—We visited ten headings, but as each one showed a thickness of stone of 8 ft.*, and were similar in other respects, they need not be separately referred to. In one part of the quarry the freestone was 7 ft. 6 in.* in thickness, resting on a hard bed containing blocks sometimes sawn into slabs for paving purposes. This latter stone cannot, of course, be considered in the same light as the freestone.

Quarry No. 24.—Known, like the preceding, as Westwood quarry, and adjoining it. It is a very large quarry. Amongst the headings visited we noticed three, in which the stone was—point 24^a, 7 ft.* in thickness; point 24^b, 5 ft.* and 3 ft. 6 in.; and point 24^c, 6 ft.* and 3 ft. 6 in. One of the peculiarities noted was that no matter in what direction one penetrated from the entrance, it was very wet for a certain distance, and then the galleries became suddenly dry. The Great Oolite formation at this spot is partly covered by clay, which prevents the free percolation of water, so that where the oolite is protected by the clay the ground is dry. This is an interesting fact, amongst many others, gleaned during this visit from the point of view of water-supply. In some of the quarries we were able to ascertain the rate of percolation from the surface, the results being of much use in another connexion. The "Westwood Ground" stone itself may be described as a shelly oolite, in which the shelly constituent is the predominant, and the granules larger than in most other kinds of Bath stone; the matrix is not very crystalline, though abundant.

F.—*Monkton Farleigh Area.*

The stone mines in this area may be divided into two sections—those near the village of Monkton Farleigh, which are the more important, and those between that place and Box on Kingsdown. Dealing with the latter first, we come to

Quarry No. 25.—Longsplatt quarry, Kingsdown. It is a mine showing a great thickness of stone at the headings, cut up into several beds, in descending order as follow: Useless stone, 2 ft.; soft, fine-grained oolite, 1 ft. 6 in. and 1 ft. 6 in.*; "fine-bed," 1 ft. 6 in., 2 ft., 2 ft., 2 ft., and 2 ft. 6 in.; "oaty bed weather" stone, 2 ft.*; "fine-bed" (of the same character as that above the "oaty" bed), 3 ft., 3 ft.*, and 4 ft. It is difficult to satisfactorily classify any of these beds; some of them partake of the character of Farleigh stone, whilst others remind one of the Box ground. In reality the "fine-beds" constitute a distinct variety of Bath stone. The material is fine-grained, contains an abundant matrix, and although distinctly a shelly oolite, the granules are not very conspicuous unless seen under the microscope. The "oaty" bed contains small local patches of concretionary origin, at which places the stone is much harder than at others.

Quarry No. 26.—Kingsdown quarry, situated about half-way between the Longsplatt and Farleigh groups; it is not important. At one point underground (No. 26^a) there were eight beds as follow:—2 ft., 1 ft., 1 ft. 6 in.* 1 ft., 2 ft. 8 in., 2 ft., 2 ft. 2 in., and 3 ft. At the time of our visit the material, much cut up by jointing, was very rough. At another point (26^b) there were nine beds—1 ft. 6 in., 1 ft. 7 in., 1 ft. 8 in., 1 ft. 4 in., 2 ft. 4 in.*, 2 ft. 10 in., 1 ft. 4 in., 2 ft. 5 in., and 4 ft. 3 in. Here, also, joints were frequent, but the quality of the stone did not seem to be impaired. At a third point (26^c) the face of stone was so much cut up, both by bedding and jointing, that it hardly seemed worth working.

Quarry No. 27.—This is by far the most important mine in the Farleigh district, and yields, together with that next to be described, practically all the "Farleigh Down" stone, properly so called. The quarry-masters allude to each heading (or local groups of two or three headings) as a separate quarry, but we have not adopted this course. The stone, as a whole, may be described as being a light cream oolite, fine grained, compact and uniform, shelly matter not being abundant. It is very variable in character at the different headings, and whilst much cannot be said to be of a durable description, yet here and there a fairly good stone is obtainable. A special feature of the bottom beds was the occurrence of large pieces of fossil wood, which we should not notice here, except that they produce soft places, and sometimes holes. In many of the other quarries similar pieces of fossil wood were found, but not in such abundance as in No. 27.

The following headings were visited, and are far removed from one another:—

Point 27^a.—Beds 2 ft. 6 in., 1 ft. 3 in., 1 ft. 7 in., 1 ft. 10 in., 10 in., 1 ft. 6 in.*, 1 ft., 1 ft., 1 ft., and 2 ft. 6 in.

Point 27^b.—Beds 2 ft. 6 in., 1 ft. 3 in., 3 ft. 3 in., 1 ft. 3 in., 4 ft.*, 3 ft., and 3 ft. 6 in.

Point 27^c.—Beds 2 ft., 1 ft. 8 in., 1 ft. 4 in., 2 ft. 7 in., 2 ft. 2 in., 2 ft. 10 in., 2 ft. 8 in., 2 ft. 10 in., and 5 ft.*

Point 27^d.—Beds 2 ft., 2 ft. 8 in., 3 ft. 4 in., 1 ft. 4 in.*, 1 ft., 1 ft. 8 in., and 3 ft. 8 in.

Point 27^e.—Beds 2 ft. 4 in., 1 ft. 10 in., 1 ft. 7 in., 4 ft 8 in., 4 ft.*, and 5 ft.

The 5 ft. bed from which the sample from point 27^c was obtained is of a reddish-brown tint, and is sold for outdoor work more particularly. It is certainly the most durable of the "Farleigh Down" stones. When dry it is not so deeply coloured as that from Winsley.

Quarry No. 28.—South Farleigh quarry. The disposition of the stone underground is rather peculiar; it represents wedge-bedding on a large scale, but the strata are of regular thickness throughout, and present the normal features of dipping. At one heading, point 28^a, the following thicknesses of beds were shown:—2 ft., 1 ft. 9 in., 1 ft. 6 in., 1 ft., 2 ft., 1 ft., 8 in., 2 ft.*, 2 ft., 1 ft. 3 in., and 1 ft. 5 in.; at another point, 28^b, they were, 1 ft. 10 in., 1 ft., 1 ft. 2 in., 6 in.*, 1 ft. 2 in., 1 ft., 1 ft. 4 in., 1 ft. 8 in., 2 ft., and 2 ft.

G.—*Box Area.*

The enormous workings between Box Hill and the end of the railway tunnel towards Corsham, form the largest stone mine in the United Kingdom, and probably in the world; they are reached by several entrances. The area occupied is irregularly oval in form, about two miles in length and one mile in width, a system of light railways, and a siding from the G.W.R. at the Corsham end, serving to haul the stone out of the quarries. About two-thirds of this area, towards the west, furnishes the "Box ground" stone; the remaining one-third being exploited for divers kinds of Corsham stone. Outside this immense mine, to the north and south, are other and independent quarries also furnishing Corsham stone. In the maze of galleries and tunnels it is not easy to work out the precise lie of the beds, and so to ascertain the relative positions of the Box ground and Corsham stones, but we offer a solution in the sequel, based on a general survey of the points examined, and are tolerably sure that it is, in the main, correct.

Quarry No. 29.—This is the only open working in the area, and is not important; at the time of our visit it was being converted into a mine. One open face gave the following remarkable detail (fig. 5). We observe that in the upper part of this section the beds are horizontal, under which is a series wedge-bedded, followed by another horizontal parting, the base showing wedge-bedding in the opposite direction. Underground we measured the following beds:—2 ft. 4 in., 4 ft.*, and 4 ft. The stone is of a cream tint with light brown specks, and is of

FIG. 5.

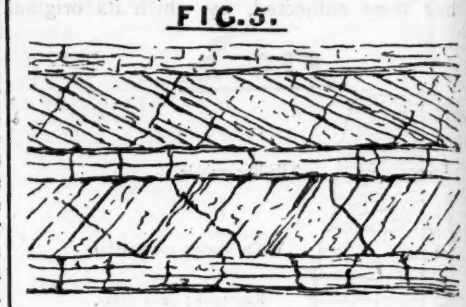

FIG. 5.—*Section of open working showing wedge-bedding in two directions, Box Hill.*

medium grain. Shelly matter is plentiful, oolitic granules very minute, the crystalline matrix not being abundant.

Quarry No. 30.—Clift quarry, from the entrance of which the whole of the remaining workings yielding "Box Ground" stone may be reached. It is perhaps the best "show" quarry in the Bath district, the antique and fearful-looking engine running in and out having attracted considerable attention. One may here walk underground for miles, the headings are innumerable, and we elected to examine only a few at sufficient distances apart. It may be worth mentioning, that after a storm on Box Hill, it takes from thirty-six to forty hours for the rain-water to percolate from the surface to the workings underground—a depth of about 110 ft., made up of alternating beds of "rag" and soft stone of no commercial value. Headings yielded the following thicknesses of stone:—

Point 30^a:—Beds 2 ft., 3 ft., 3 ft. 4 in.*, 2 ft. 4 in., 2 ft., 1 ft. 6 in., and 2 ft. 9 in.

Point 30^b:—Beds 3 ft. 3 in., 3 ft.*, 3 ft. 9 in., 2 ft. 3 in., 3 ft., and 3 ft.

Point 30^c:—Beds 5 ft., 3 ft. 4 in.*, 3 ft. 10 in., 4 ft., and 3 ft. 2 in.

Point 30^d:—Beds 2 ft. 4 in., 3 ft., 5 ft. 2 in.*, 4 ft., and 1 ft. 10 in.

At the heading point 30 *c* we saw a block quarried measuring 10 ft. × 4 ft. × 3 ft. 3 in. An old working, known as the "Cathedral" near this point will be adverted to in our remarks on the methods of quarrying the stone in olden times. All we need now say in reference to this is that then the material was obtained from three distinct levels by means of galleries. That quarried from the uppermost gallery was called "Box Scallett," from the middle, "Box Corngrit," and from the lowest level, "Box Ground," which latter is the only variety now exploited.

Quarry No. 31.—Known as "No. 4 Box" quarry, from its proximity to shaft no 4 of the Box tunnel on the Great Western Railway. A heading showed beds as follows:—2 ft., 3 ft. 6 in., 1 ft. 10 in.*, 5 ft., and 4 ft. The stone is a rather coarse-grained shelly oolite with sparse crystalline matrix.

Quarry No. 32.—Tyning quarry. A heading gave 2 ft., 2 ft. 6 in., 2 ft. 2 in., 2 ft. 9 in.*, and 4 ft., as the thickness of beds.

Quarry No. 33.—This, the most easterly of the Box Ground group is called "No. 6 Box" quarry. It is close to those yielding Corsham stone. Two headings examined gave:—Point 33^a, 3 ft. 8 in., 1 ft. 2 in., and 2 ft. 10 in.*, and point 33^b., 4 ft.*, and 4 ft. 4 in.

Quarry No. 34.—This embraces a number of headings known as the "Lower Hill Box" Quarries, which we did not visit. The stone is practically the same as that from the Clift quarry near by.

H.—*Corsham Area.*

The stones obtained from this area, following the several varieties, are known by the following names in the market:—Corsham, Corsham Down, Corngrit, Hartham Park Corsham, Hartham Park Ground, Scallett, and Corsham Blue.

Quarry No. 35.—This working and the next, known as Hartham No. 2 and No. 1

Quarries respectively, are the most northerly in the Bath district, and are, to a certain extent, isolated from the main Corsham quarrying area. A number of different kinds of stone are raised, and we think the quarry-masters are judicious in giving some of them distinctive names, as in certain respects they are peculiar. There are several headings; a typical one gave the following: Scallett, 2 ft. 6 in.*; Hartham Park Corsham, 2 ft. 6 in., 1 lt. 6 in., 1 ft. 6 in., 2 ft., and 2 ft.*; Hartham Park Ground, 2 ft. 6 in., 2 ft. 6 in.*, 2 ft. 8 in., and 4 ft.—a total thickness of 23 ft. 8 in. The vertical joints are few and far between—some from 30 ft. to 40 ft. apart—though occasionally a "blind" joint, running through two or three beds, only, occurs between. Speaking in general terms these may be classed amongst the better kinds of Corsham stones; the "Scallett" bed is a very fine-grained true oolite, the Hartham Park Corsham has to a large extent been derived from pre-existing shelly oolites, and has a finely-granular matrix, whilst the Ground stone is characterised by its sparse matrix. They are all of a light yellow tint.

Quarry No. 36.—This was not being so actively exploited as the last-mentioned working at the time of our visit; the section and character of the stone are similar to it. As before stated, it is known as the Hartham Park No. 1 Quarry.

Quarry No. 37.—Opened about 50 years since, and called Corsham Down Quarry. As indicated on the map (Fig. 1), it forms part of the large Box-Corsham Mine. The stone was discovered during the construction of the Box Tunnel on the Great Western Railway, and there is a railway siding running into the quarry underground. The workings are divided into two parts, according as they are situated north or south of the railway line. Three kinds of stone are recognised: (1) Corsham Down "bottom bed"; (2) Corngrit; and (3) Corsham Down "fine upper" bed. There are sixteen headings, most of which we visited, and measured the following:—Point 37^a.—"Corsham Down upper," 3 ft. 6 in., 2 ft.*, 1 ft. 8 in., 2 ft. 6 in., and 3 ft. 6 in.; Corngrit, 2 ft. 6 in.*; and "Corsham Down bottom," 4 ft. 6 in.*, and 3 ft. 6 in.* The beds in this quarry are rather curiously disposed, as will be gleaned from the following diagram (fig. 6). Those

FIG. 6.

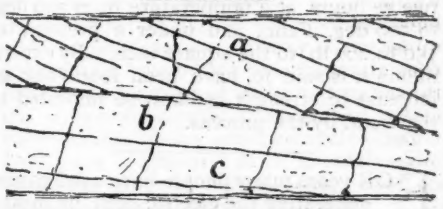

FIG. 6.—*Section showing the Disposition of Corsham Stone Beds in Quarry No. 37.*

a = "Corsham upper"; *b* = "Corngrit"; and *c* = "Corsham bottom."

at *a* are wedge-bedded, and dip S.E. at the rate of 4 ft. in 17 yards, and rest on *b*, also dipping slightly to the south; whilst *c*, to a certain extent, follows *b*. From this it will be perceived that the Corsham Down "upper" stone is worked along several different beds, as the constantly-recurring dip of the wedge-bedding brings them into view in the process of quarrying. The beds dipping so slightly, however, and the quarry running chiefly east and west, there are not so many beds as at first sight might seem to be the case. At point 37^b the following section was seen:—Corsham Down "upper beds" 1 ft. 7 in.* and 3 ft. 10 in., and Corngrit 1 ft. 8 in.* This section is to the north of point 37^a, and we notice that the beds are much attenuated. Sometimes the Corngrit occurs in two beds; on running to the south of the tunnel the lower one becomes thin and hard—in fact, there it is a species of ragstone of no use for building purposes. The term Corngrit is derived from the speckled appearance assumed by the stone. It is extremely variable in structure, however, and in certain places resembles the Corsham Down beds. On the average it is lighter in colour and harder than they, and the concretionary patches forming the speckles alluded to are very characteristic. Of the Corsham Down beds, there does not seem to be much difference between them, but of the two horizons the upper would, no doubt, prove the more durable. They are true oolites, with very little foreign matter.

Quarry No. 38.—Huddswell quarry, and the stone is known by that name, or as "Corsham." Sections yielded—point 38^a, 1 ft. 4 in., 3 ft. 6 in., and 2 ft. 4 in.; the bed below this is a modified Corngrit, 2 ft. in thickness; point 38^b, 1 ft.*, 3 ft., 1 ft. 10 in., and 1 ft. 4 in.

Quarry No. 39. — "Stone's No. 6 Corsham"; it is exploited both north and south of the railway tunnel, and is very straggling. The following occurs in the northern portion, point 39^a, Corsham stone, 1 ft. 6 in., 2 ft., 2 ft. 10 in., 2 ft. 3 in., and 2 ft.; Corngrit, 2 ft. 10 in.*; and Corsham "bottom," 4 ft. and 2 ft.* In the southern portion we have—point 39^b, 1 ft. 10 in., 1 ft. 10 in., 3 ft., 2 ft.*, 2 ft. 4 in., and 2 ft. 6 in.; point 39^c, 1 ft. 2 in., 1 ft. 9 in., 1 ft. 3 in., 2 ft. 6 in.*, 1 ft. 10 in., 1 ft. 10 in., 2 ft., and 1 ft. 6 in.; point 39^d, 1 ft. 8 in., 9 in., 1 ft. 10 in.*, 1 ft. 9 in., 1 ft. 5 in., 1 ft. 5 in., 1 ft. 2 in., 1 ft. 8 in., 10 in., and 2 ft., all of which beds are known as Corsham stone. A fault, with a drop of 9 ft., occurs in one part of the working, and on nearing the Box Ground stone, close by, we observed the following section (fig. 7), which shows the relation

FIG. 7.

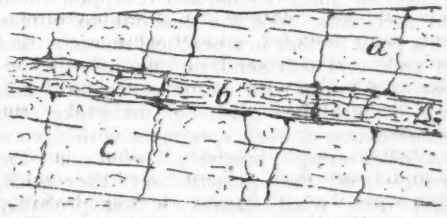

FIG. 7.—*Section between quarries Nos. 33 and 39, showing relation of "Corsham" to "Box Ground" stone.*

a=Corsham stone; *b*=Bastard stone; *c*=Box Ground stone.

existing between the Corsham and Box stones. The beds dip to the S.E. at about 4 ft. 3 in. in 18 yards.

Quarry No. 40.—"Pictor's No. 6 Corsham" quarry. The beds all dip slightly to the S.E., and are as follow:—point 40^a, 1 ft. 10 in.*, 1 ft. 6 in., 1 ft. 8 in., 3 ft. 6 in., 2 ft. 2 in., and 2 ft.; point 40^b, 2 ft., 2 ft., 2 ft., 1 ft., 2 ft. and 2 ft. 6 in.*

Quarry No. 41. — "No. 7 Corsham," "Spring," or "Waterhole" quarry, yielding beds as follow:—1 ft. 6 in., 1 ft. 10 in., 2 ft., 2 ft., 2 ft. 6 in.*, 1 ft. 6in. and 3ft.* The lowest beds here are remarkable as yielding a blue stone; it occurs in the manner indicated in fig 8. As will be seen, this material is not found in any large quantity, it has been used principally in churches and for columns. The existence of the bed is not generally known.

On the bank of the quarry above ground we examined in detail the various kinds of Corsham stone in process of "seasoning," *i.e.*, left in the open-air to dry. There is nothing worth recording respecting this, except in reference to the Corngrit. The majority of the blocks of this material were

FIG. 8.

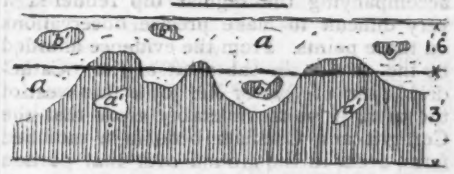

FIG. 8.—*Section of the two lowest beds in quarry No. 41, showing the mode of occurrence of the blue stone.*

a=Normal cream-coloured oolite; a^1=patches of the same in *b*; *b*=oolite coloured blue, mostly in lowest bed, but also in bed above; b^1=patches in *a*.

found to have hard calcite veins running through them, and always in one direction, at right-angles to the bedding-planes. These appear to hinder the penetration of water through the stone, as will be seen in fig. 9.

FIG. 9.

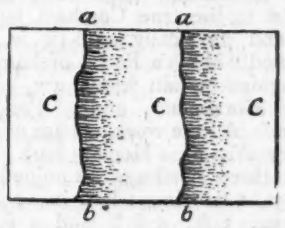

FIG. 9.—*Face of a block of "Corngrit," showing calcite veins acting as damp-courses.*

a=Hard calcite veins running through the stone; *b*=Moisture in the stone arrested by *a*; *c*=Comparatively dry areas.

On building the material into walls, if the stone is turned up on its bed—and in the case of this particular kind of Bath stone, which exhibits hardly any trace of bedding, this would not facilitate weathering—the thin calcite veins *a* could not fail to act as damp-courses.

Quarry No. 42.—As will be seen by referring to the map (fig. 1), this is not connected with the Box-Corsham stone mine, but is so close to it that the produce is practically the same. It is known as Sands, or Westwell's quarry, and is a comparatively new working. A heading yielded the following beds, all called Corsham stone—2 ft., 1 ft., 3 ft.*, 4 ft., 2 ft., and 2 ft. These thicknesses vary, however, within very short distances, for the bedding-planes are not regular, even for a few yards. At the time of our visit one of the headings was not in good condition, though such an occurrence is, of course, liable to take place in any quarry.

FIG. 10.

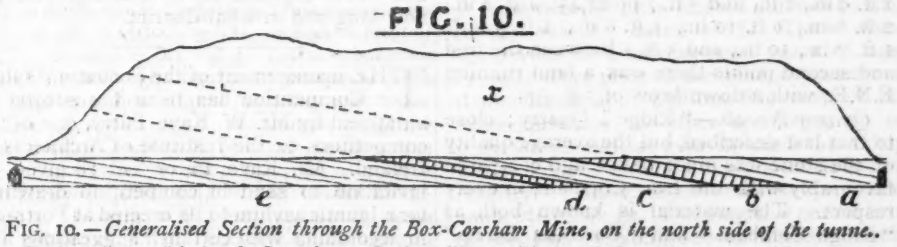

FIG. 10.—*Generalised Section through the Box-Corsham Mine, on the north side of the tunne..*

a=Corsham, "upper" beds. *b*=Corngrit. *c*=Corsham "bottom" beds. *d*=Bastard-stone. *e*="Box ground' stone. Dip of beds exaggerated. *x*=Ground over quarries.

From data derived during our examination, and for the most part given in the foregoing observations on the Box and Corsham areas, we are enabled to present the following as a general section (fig. 10), through the large mine. The bed *c* is not important as a building-stone in some parts of the mine, and very likely merges into *d* or *b*. The Box Ground stone thins out on approaching Corsham, or, at least, becomes so modified in structure that it ceases to be of any value for building purposes beyond the point shown. The base line drawn, which indicates the floor of the present workings along the line of section, is said by all concerned to mark the inferior limit of the good stone, though we had no means of proving this. The best stone is found only

d

in the position between the parallel lines indicating the floor and ceiling of the quarries. The phenomenon of wedge-bedding accompanying the regular dip rendered it very difficult to make precise observations on these points. From the evidence afforded by the section in the shaft at the "Cathedral" (part of Quarry No. 30) to the west of the area, it seems tolerably clear that the Corngrit and Corsham beds, in a modified form, occur in the ground over that portion of the quarries, and their approximate position is dotted in accordingly. That there are no really good beds of building-stone in the 100 ft. odd above the mine, is rendered certain in the details afforded by the vertical ventilating shafts both in the mine and tunnel, though here and there, at different levels, the material looked promising.

I.—*Monk's Park Area.*

We have grouped the following quarries under this heading more from their geographical position than from any peculiar features presented. Generically the stone is related to the true Corsham, both structurally and physically, and it is, indeed, often called "Monk's Park Corsham" stone. Then, again, certain kinds are known as "Ridge Corsham" and "Park Lane Corsham." All the workings are mines.

Quarry No. 43.—Monk's Park northern quarry; three headings examined gave—Point 43^a, 1 ft. 7 in., 1 ft. 6 in., 1 ft. 10 in., 1 ft. 5 in., 3 ft., 4 ft.*, and 3 ft. 6 in.; point 43^b, 2 ft. 5 in.* 1 ft. 4 in., 1 ft. 4 in., 2 ft., 3 ft. 3 in., 2 ft. 2 in., 3 ft. 3 in., and 3 ft.; point 43^c, 2 ft. 9 in., 2 ft. 9 in., 2 ft. 6 in., 1 ft., 2 ft. 6 in., 3 ft., 2 ft. 6 in.*, and 2 ft. Certain beds had calcite veins running through them, with results similar to those already described (fig. 9); these are, no doubt, the best "weather" beds.

Quarry No. 44.—Eastern Monk's Park quarry; three headings yielded beds as follow:—Point 44^a, 1 ft. 2 in., 2 ft., 2 ft., 1 ft. 3 in., 2 ft. 6 in.*, 3 ft. 6 in., and 3 ft. 9 in.; point 44^b, 4 ft., 2 ft. 3 in., 1 ft., 1 ft. 8 in., 2 ft. 10 in.*, and 4 ft.; point 44^c, 2 ft., 1 ft. 8 in., 1 ft. 3 in., 2 ft., 1 ft.*, 3 ft., 2 ft. 10 in., and 4 ft.

Quarry No. 45.—Western Monk's Park Quarry; a quantity of the material was cut up and decomposed, so much so that it was difficult to work, and the proportion of bad to good stone was very considerable. It is some distance from the last-mentioned quarry, and the produce is known as "Ridge Corsham." Three headings measured gave—point 45^a, 2 ft., 1 ft. 10 in., 2 ft. 8 in., 1 ft. 5 in., 1 ft. 9 in., 2 ft. 9 in., 1 ft. 10 in.*, 2 ft., 3 ft., and 1 ft.; point 45^b, 1 ft. 7 in., 1 ft. 3 in., 1 ft. 8 in.*, 8 in., 3 ft. 6 in., 1 ft. 10 in., 1 ft. 9 in., 1 ft., and 3 ft.; point 45^c, 1 ft. 8 in., 2 ft. 6 in., 1 ft. 10 in., 1 ft. 8 in., 1 ft. 5 in.*, 1 ft. 7 in., 10 in., and 3 ft. Between the first and second points there was a fault running E.N.E., with a downthrow of 7 ft.

Quarry No. 46.—"Ridge" Quarry; close to that last described, but the average quality of the stone was much better, and compared favourably with the true Corsham, in every respect. The material is known both as "Ridge Corsham" and "Corsham Down." A heading gave 1 ft. 6 in., 1 ft. 6 in., 1 ft. 6 in., 2 ft., 2 ft., 2 ft. 6 in.*, and 2 ft. 6 in.; but in this instance the thicknesses varied within short distances. It will be noticed that the beds are thin, but we measured one block drawn out of the quarry which was 2 ft. 10 in. on the bed, and were informed that occasionally 4 ft. stones could be procured. An interesting case of step-faulting occurred here, which will be alluded to in describing the methods adopted in quarrying Bath stone.

Quarry No. 47.—Park Lane Quarry; situated about half a mile S.W. of the last mentioned. Sections—point 47^a, 2 ft. 4 in., 1 ft. 7 in., 1 ft. 5 in., 1 ft. 9 in., 3 ft.*, 2 ft., 2 ft., and 2 ft.; point 47^b, 3 ft. 10 in., 1 ft. 1 in., 2 ft., 3 ft. 2 in.*, 2 ft. 6 in., 3 ft. 3 in., and 3 ft.; point 47^c, 2 ft., 1 ft. 2 in., 1 ft. 5 in., 2 ft. 4 in., 2 ft. 6 in.*, 2 ft. 6 in., 3 ft. 3 in., and 3 ft. 8 in., all known as Corsham stone.

Quarry No. 48.—Old workings above Bathampton, from which enormous quantities of Bath stone have been extracted.

(To be concluded in our next.)

NOTES.

THE House of Commons Committee on the Tramways Bill of the London County Council has decided to allow the Council to work the tramways, if it desires to do so, subject to certain restrictions as to by-laws. It is by no means clear that the County Council will work these lines, for the Bill does no more than give it the power to do so if it wishes. The further question must be determined by the Council itself. The importance of the decision of the Committee arises chiefly from the fact that it gives a legislative sanction to the demand of the County Council to become both owner and worker of the tramway-lines of London; in other words, to enter into direct competition with the omnibuses and railway companies of the metropolis. Whether it is desirable that a Municipal Corporation should go so far out of its general sphere as to become a simple trader is exceedingly doubtful, and if the principle is allowed in regard to the supply of the means of locomotion it is difficult to see why the County Council should not buy up all the bakeries and butchers' shops in London.

READERS who will refer to our Student's Column of this week will find (page 286) that we have gone into the subject of the efflorescence on bricks which often causes so much trouble and disappointment to architects. We are desirous to pursue this point further in a practical manner; and if architects will send to this office specimens of bricks with efflorescence on them, we should be glad to undertake the examination of such specimens with a view to discovering precisely what is the nature of the growth on the brick, and from what causes it has probably arisen. The specimens would have to be kept for a few months to note peculiarities of growth, and perhaps to "cultivate" the scrapings in gelatine for bacteriological observation. In other words, we will undertake a scientific investigation into the matter if architects will send us the material for it. It would be well that all specimens sent should have a label attached giving the name and address of the sender, and the name, if known, of the brickmaker, or of the locality from which the brick comes, also whether it has been exposed on a building, and for how long and in what district.

THE management of the Portrane Asylum Competition has been the subject of an appeal by Mr. W. Kaye Parry, one of the competitors, to the Institute of Architects of Ireland. Mr. Kaye Parry had received an invitation to send in competition drawings for a lunatic asylum to be erected at Portrane, in accordance with certain "suggestions and instructions" accompanying the invitation. Mr. Parry's complaints are that the terms of the competition had been violated in various ways; that the first three competitors, of whom he was one, were bracketted together, and three equal premiums given, though the engagement was to give premiums of 100*l.*, 75*l.*, and 50*l.*, to the designs placed first, second, and third; that the designs were exhibited before adjudication, and the names of authors became known, whereas the conditions had expressly promised exhibition *after* adjudication; that the report of the Committee of selection was referred to the Governors of the Richmond Lunatic Asylum for their opinion, which was going outside the advertised conditions of the competition, in taking an opinion from a body not mentioned in the conditions, and doing so after the competitors' names were known; lastly, and most important of all, that one of the three "bracketted" competitors was afforded an opportunity of amending his design for final acceptance, which was not afforded to the others. The President and Hon. Secretary of the Institute of Architects of Ireland (Mr. Thos. Drew and Mr. Albert E. Murray) have given their opinion entirely in favour of Mr. Parry's position in regard to nearly all his questions; the questions and answers were published in the *Irish Times* of Saturday. It would appear, from the perusal of them, that the conduct of the competition has been exceedingly irregular.

THE question of the preservation of wood seems to have been taken a step further by the Haskin Wood Vulcanising Company. By the processes hitherto in use, the principle has been the extraction of the sap by some artificial process, and the introduction in its place of some foreign matter, such as corrosive sublimate, chloride of zinc, sulphate of copper, and pure creosote. Of these, creosoting is the only one that has been extensively used, but it has some objections—viz., the impossibility of impregnating the wood with the oil to any great depth, as also that it can only be used in rough out-of-door work, in consequence of its objectionable smell. The vulcanising process, which has been on view in London during the past week, however, is opposed to any of the foregoing processes, the inventors contending that the sap, being the life-blood of the wood, should not be extracted, but should be treated within the pores of the wood, so that the whole of the life-preserving qualities are retained but solidified. The wood may be taken in its green state, and the compounds then in the sap are, by great heat and air-pressure, distilled and retained within the wood without losing their antiseptic and preservative properties. By this means the resinous and other compounds become coagulated and impregnate the whole substance. A point which the inventor insists on is that the timber is treated through and through, is without smell, and can be worked with tools with the greatest ease. Some of the interior fittings of the large hotels of New York have been treated with the system, it is stated with satisfactory results. The process is applied by means of the wood being placed in closed steel cylinders, from eight to twelve hours, at a temperature from 300 deg. to 500 deg. Fahr., and under a pressure of 150 to 200 lb. to the square inch. By experiments it is said to have been found that an increase of strength is likewise imparted to the wood by the process.

FOR years many people have used gas for generating the electric light by means of a gas-engine and dynamo, instead of burning the gas directly to give light. That this can be done economically on a large scale has long been the opinion of many of the highest authorities, and they can now point to the station of the Belfast Corporation as demonstrating their theory. The Corporation asked Professor Kennedy to prepare their specifications, and the system adopted being a novel one, a short description of it may be interesting. Practically, it amounts to this—the Central Gas Works supplies gas for the engines of sub-stations, which generate electricity and distribute it by the three wire system. At present they have one station open which contains one of the largest, if not the largest, gas-engine plant in the world. The six gas-engines were supplied by Messrs. Dick, Kerr, & Co., of Kilmarnock. Four of them, which are used to drive four large Siemens dynamos, are tandem engines, that is, their cylinders are in one line, and their pistons actuate the same piston-rod, so that there is an explosion for every half-revolution of the crank. This greatly promotes steady running, a first essential in an electric-lighting engine. The tandem engine is more economical than having a double gas-engine, and there is also a

decided saving in floor-space. The engines can each be started at once, all that is necessary being to turn a switch on the switch-board. This is done by letting one of the dynamos run as a motor until the engine is started. This method of starting was, we believe, first employed by Sir David Salomons, at his private residence at Broomhill, Tunbridge Wells. The convenience of being able to turn on and off your engines at will, and the saving in boilers and attendance, gives gas-engines a great advantage in this respect over steam-engines. The Corporation are only charging 7d. per unit, the same price as at Dublin and Glasgow, and yet they are making a fair profit. We would recommend the action of the Belfast Corporation as being well worth considering by other local bodies who are interested in gas as an illustration of how to prevent the progress of electric lighting depreciating their property.

A REPORT was presented recently to the Local Government Board by Dr. Bulstrode on the general sanitary condition of the village of Linslade, in the Leighton Buzzard Rural Sanitary District, and on the circumstances attending an outbreak of diphtheria there. In the course of the Report it is stated that the water supply is derived almost exclusively from wells sunk in the Lower Greensand, the formation on which the village is in the main situated. The wells are all dry-steined, and in numerous instances are in positions which must seriously endanger the purity of the water they supply. Many are situated but a few feet in each instance from a privy sunk below the ground level, or in contiguity with an ashpit situated at a higher level than the well; and it is believed that three-fifths of the wells in the village are polluted. A great part of the drainage of the village goes into a stream which passes through almost the centre of Linslade, and receives the drainage of at least 120 houses. The condition of this stream has in the past given rise to numerous complaints, and it has been recently cleaned out. In fact, its state at the present time is described as being better than ever before. But the water in it gradually assumes the appearance of liquid sewage as it passes through the village, and this is more particularly noticeable where the water is comparatively deep. The bottom of the stream is covered with a deposit of thick black mud, which rapidly imparts an inky colour to the stream upon being disturbed. Several people in Linslade complained of the nuisance which the stream frequently caused, and of the objectionable odours which emanated from it. Excrement is disposed of in Linsdale either by means of privy-vaults, sunk below the ground-level and lined with brick; or by pail-closets, of which there is an increasing number in the village. The privy-vaults are very abundant, and are frequently so close to the wells as to seriously endanger the water, and so near to the dwellings as to almost necessarily pollute the soil beneath the houses, and contaminate the air in their vicinity. The privy-vaults are emptied by the occupiers when full, and the average interval between the operations is about twelve months. The Report sums up to the effect that "the general sanitary condition of Linsdale is such that a public water-supply and a proper system of sewage are greatly needed."

A VERY radical-looking pamphlet which has been forwarded to us, from the "English Land Restoration League," entitled "Among the Agricultural Labourers with the Red Vans," appears to derive its title from the fact that in the first instance an old Post Office parcels van was purchased as a vehicle wherein to send men up and down the country to preach the doctrine of the restoration of the land to the people, &c. With these political doctrines in the wider sense we have no concern, and should not have noticed the pamphlet except for the illustrations given on two pages (from photographs) of the residence of a large owner of property in Wiltshire, and of the interior and exterior of one of the labourers' cottages on his estate. The illustrations being from photographs, there is no room for exaggeration, though no doubt this may be a specially bad example picked out. However that may be, the presence of a dwelling-house in such a state as this cottage, on a presumably wealthy owner's estate, is a disgrace to the wealthy landowner. We refrain from giving his name, though the "Land Restoration League" (naturally) is not so reticent.

THE Metropolitan Public Gardens Association have completed their laying-out of All Hallows-on-the-Wall churchyard, in London Wall. The ground lies in two slips, to the east and west of the church, between the street and portions of the old City wall. Of the church, built in 1765–7, after the designs of George Dance the younger, and of its history, we gave a short account in a "Note" on June 28, 1890. In our issue of April 25, 1885, we published a view of the former church's exterior, after Toms and West, with a description taken by Toms from Hatton's "New View." So we need only say now, that four years ago was announced the discovery in an old chest in the vestry, of a register of churchwardens' accounts, with entries beginning from the reign of Henry VI. In the course of next month the Association will open the disused burial-grounds of St. Mary's, Woolwich, and St. Peter's, Walworth, as converted by them into places of public resort and enjoyment.

THE Tol-house Trustees, Yarmouth, ask for subscriptions towards their projected purchase and preservation of some interesting remains of the Franciscan Monastery in that town. Speed records that the Grey Friars, or Minorites, were settled in Yarmouth by Sir William Gerbrigge, Knight, of Wickhampton, who was bailiff in 1271; by another account they were established there, somewhat later, by Edward II. They seem, either way, to have come from Norwich, where the Order stayed first in 1226. In accordance with their wont, the various Orders, in taking up residence at Yarmouth, divided the town into four districts. The Carmelites, or White Friars, went to the north, the Dominicans, or Black Friars, to the south, the Augustines to Southtown (with a cell within the walls), and the Grey Friars to the middle. Thus the Franciscans built their house on a spot lying between the river (west) and the Middle Gate (east); the two rows numbered "83" and "96" marking, latterly, the north and south limits respectively. Their conventual church stood about midway down Queen-street; next south lay the cloisters (wherein the bailiffs often held their courts), remains of which may yet be found in the walls and cellars of cottages round about. The cloisters enclosed a "green yard," being, we think we correctly say, the burial-ground behind the Unitarian Chapel, *prius* "Old Meeting House." Here the friars prospered, counting among their benefactors Thomas de Drayton, who was Admiral of the North in 1338, and three times elected burgess in Parliament for the borough: he was a contemporary of Hugh Fastolfe. At the Dissolution Grey Friars was granted to Cromwell, Earl of Essex, and next to his nephew, Sir Richard Williams: in 1569 it is owned by the Corporation. In 1608 James I. gives them a charter to hold the site of the late house of Friars Minorite. A few years later part of the area was taken for an artillery-yard and exercise-ground for the trained band of Militia; in 1657 the Corporation sold for 2,600*l.* a large portion for the building thereon of a "broad row" (Queen-street) and a "narrow row." A leading share in the preservation, lately effected, of a part of the cloisters was taken by Messrs. Bottle & Olley, of Yarmouth, who, in conjunction with Mr. Loftus Brock, were employed as architects for the repair of the Tol-house, ten years since; *vide* our "Note" of February 2, 1885.

THE Carpenters' Company is offering some special prizes, in connexion with "Harben's Gift," for the encouragement of artistic design and workmanship. One of those which we are most pleased to see is one for "A Chair for Ordinary Use" which can be sold at a price not exceeding 1*l.*, which must be accompanied by a guarantee that the firm exhibiting it will supply it to the public at the price named. When we see the word "firm," we hope it is also to be an understood thing that the name of the man who actually designed the chair will be given. As we have often pointed out, a "firm" cannot make a design, which must be the work of an individual mind. In connexion with this subject we may remind the Company that Mr. William Morris long ago did produce a chair answering to these conditions, which was sold at, if we remember right, 9s. or 9s. 6d. We believe the price has been raised somewhat since then, but that is probably only a consequence of the general rise in cost of labour. Another prize is to be awarded for "A Hall Bench with Carving," and another for a Table 4 ft. by 3 ft. 4 in. measurement, which must combine strength and steadiness, and be offered at a price not exceeding 5*l.* For a plain table of the size mentioned, the price seems pretty liberal. The foregoing prizes are to be given this year, and next year it is announced that a special prize of 20*l.* and a gold medal will be given for the best font-cover executed in oak. A long date has been given, so as to enable those who have not much leisure time to enter into the competition.

THE President of the Royal Society of Painter-Etchers was "At Home" to members and their friends at the galleries of the Society on Friday last. A notice of the etchings on view has already appeared in the *Builder*. After the reception, the President, Mr. Seymour Haden, gave, by request, an illustrated lecture on certain points connected with the etched work of Rembrandt. He said that during the past forty years much has been done to dissipate popular errors concerning the etched work of Rembrandt, but much remained to be done; gross errors of attribution continued to appear in catalogues and books of reference. That Rembrandt did etchings prior to 1628 there could be no longer any doubt; at least two portraits existed anterior to that of his mother, dated 1628. These were done when he was seventeen years of age, *i.e.* four years prior to the generally accepted date. Rembrandt did not, like most of his contemporaries in other countries, go to Italy for inspiration; he devoted the thirty years of his artistic life to work in his native country. During these years he produced some 250 etchings. Dividing this period into three decades, it would be seen that Rembrandt employed during each one a different method of production and a different class of subject. For the first decade he almost exclusively devoted himself to bitten work in the production of figure subjects; during the second decade to bitten and dry point, chiefly in landscape; the third and last decade to pure dry point, with a return to figure subjects. In the first division of the thirty years he worked on original ideas, during the second and third he frequently adapted the subjects and drawings of others to his own methods. In many cases his pupils or assistants worked on the background or accessories; the principal figure, or, perhaps, a face only, being the master's work. Of this, many notable examples existed. As might be expected, there were cases of overlapping in respect of method of production and choice of subject; but

these sub-divisions were broadly correct, and greatly assisted in the study and appreciation of Rembrandt's works. Of the attribution to Rembrandt of etchings now known to be by Lievens, Bol, and others, Mr. Haden had many things to say. Examples of Rembrandt's works, in the order mentioned, were shown on a screen, the illustrations in all cases being excellent. The chronological order of arrangement of an artist's works, particularly those of Rembrandt, has great advantages over the subject arrangement. The arbitrary method now adopted in our own and other museums might be usefully replaced by an arrangement according to the date of production. The usual existing methods only confuse the sense and render critical comparison impossible.

THE Exhibition at the French Gallery in Pall Mall contains a large and remarkable Turner, "St. Mark's Place, Venice" (25), earlier in date, we are told, than its style would lead one at first to suppose. It is a view looking apparently from the top of some building along the Place, with St. Mark's in the distance and the Campanile in front of it. St. Mark's is represented in a white glare which it hardly could assume under any atmospheric circumstances, and the whole effect of the picture is unreal, but it is an effect one would be very glad to see if it were possible. A collection of paintings by M. Tholen form a group by themselves. He excels in small paintings of buildings combined with woodland scenery (see Nos. 37 and 40); his largest work, "Through the Wood" (44), is cold and destitute of light. The evening scene called "The First Christmas Eve" (38), one of those realistic readings of New Testament history which have had an attraction for some French and German artists of late years, is a fine piece of evening landscape effect. Madame Henriette Browne's "Rhodian Girl" (4) is a powerful and striking picture of a dark-complexioned girl, clad in a red mantle and pink head-dress, giving the general effect of a "study in reds"; there is great power and dignity about this work of an artist whose genius is too little known in this country. Mr. C. Jacque's pictures of sheep and landscape (7, 8, 11) are not equal certainly to Van Marcke (of whom there is a good specimen, No. 1), but are broad and powerful works of their class. In No. 8, "Collecting the Flock," it is amusing to see what we may call "the Creswick dog" in the foreground, just as he often appears in Creswick's landscapes. A large painting by Ary Scheffer (55), very carefully composed, but otherwise not very interesting, recalls the echoes of a departed fame. Professor Firle's "Dreams of the Past" (59) is a large interior with figures, remarkable for its successful representation of light; the figures themselves rather want interest and attractiveness. The collection includes two small pieces by Weber, one of them the only calm sea by him we ever remember to have seen, and various works by Heffner, which, it is to be presumed, have a market-value; those who wish to possess their Heffner can procure one here. To the habitué of picture galleries it is *toujours perdrix*, and not very well-flavoured either.

THE new English Art Club Exhibition at the Dudley Gallery is less aggressive than many of its predecessors, though one is still obliged to wonder what freak of impudence possesses people who can hang such things as Nos. 41 and 79, for example, and call them portraits of ladies. The last-named is a portrait of a married lady, in whose behalf we should expect her husband would bring an action for libel against the painter, if he had a grain of spirit or proper feeling. On the other hand there are some works which are very interesting as illustrating the amount of originality of colour treatment which can be shown in a free and unfinished study of effect. Among such are Mr. Bertram Priestman's "A Blizzard at Sea" (37), Mr. E. Stott's "Milking-time, Early Morning" (39), an interior of a cow-house, lighted from outside, in which the effect of morning light is very truthfully conveyed; Mr. Draper's "Putting Out to Sea" (43), with the sketchy-looking boats visibly straining in the wind. Mr. Wilson Steer's portrait of Mr. Croal Thomson is a good likeness, but the treatment of the hands is disgraceful. Mr. Jas. L. Henry's "Waning Light, Boulogne" (82), is a really fine work, and the best thing in the room. Among other things that are of interest are Mr. Housman's title-page for a book (No. 1); Mr. Henry's sketch "At the Dock Gates" (8); Mr. D. S. MacColl's "River Landscape" (15); Mr. Pegram's portrait-sketch of a boy (27); and Mr. Charles Conder's "Premier Bal" (66), a sketch painted on silk of a girl seated in a balcony and a cloaked figure on the left; this is a mere sketch, but as a study of delicate colour harmony it is of the greatest interest and originality.

FROM the "Year Book of Australia" it appears that the past year has been an unusually bad one for architects, owing to the financial circumstances of the Australian Colonies, although some few buildings of importance have been erected or completed. It is noted that a development of exterior coloured decoration is one of the latest features in Australian work, and also (according to the "Year Book") a prevalence of "Romanesque and Jacobean feeling" (*sic*) in recent buildings. This last development seems rather enigmatical.

WE wish to call the attention of architects who send drawings which they wish to have reproduced in this journal, to the importance of always placing their name and address on a drawing, either on front or back, along with a brief title which will identify the drawing. We not infrequently receive drawings with nothing on them to identify them in any way, except by reference to a letter which comes by a different post, and which sometimes gives no description of the drawing either. Those who send drawings in so careless a manner, besides causing unnecessary trouble, run the risk of losing them or of indefinite delay in receiving them back again, and, in such case, certainly have no right to complain.

MAGAZINES AND REVIEWS.*

NOS. IV. and V. of the *Architectural Review* (Boston) have reached us together. From an article in No. IV. we learn that the question of abandoning perspective drawings in competitions is making division in the architectural camp in America. Those who are in favour of it seem to be moved largely by the influence of French practice. The *Review* complains that the value of a perspective "in acquainting interested parties with a knowledge† of how the building will look when completed is not considered, because it is maintained that laymen are not privileged to judge the design of a structure before it is executed." An article in the same number proposes to open the pages of the *Review* to more criticism of current work. It is hoped that in this way some things may be explained which are not now understood; for instance, why it is a prevailing craze to cover every piece of terra-cotta that is used in a building with ornament, and whether it is because architects think they are getting a bargain when they get the effect of carved stone at half the cost, and therefore want to have as much as they can of it. A solution of this question might be interesting on both sides of the Atlantic. The illustrations are chiefly occupied with figured geometrical drawings of Mr. Hunt's design, for the Fogg Art Museum for Harvard College, a building framed apparently (externally at least) on strictly Greek lines. Why are the windows all barred up with iron gratings, even in the Attic? Is it supposed that the contents will be exposed to pillage by enthusiastic students? The elevation for a house in New York, by Messrs. Carrère and Hastings, looks as if it came from the Avenue de Champs Elysées. American architecture, which was promising to make a style of its own, seems to have collapsed in this respect. In the illustrations of No. V. we have Gothic again, in the designs by Messrs. Cope and Stewardson for the rood-screen and Lady Chapel in the church of St. Luke, Germantown. The rood-screen is a fine and rich piece of work, but is almost pure Mediæval Gothic. The number contains a very fine illustration of the side view of the Giant's Staircase at the Ducal Palace, from a measured drawing by Mr. E. K. Taylor.

The *Art Journal* is entirely devoted to the life and works of Sir Noël Paton. To give a number of illustrations in black and white of the works of "Her Majesty's Limner for Scotland," is to present his work in the most favourable light possible, since we get rid of the crude and conventional colouring which is his weakness. Many of the outline illustrations, and heads and studies, are very charming; a single plate of the "Ancient Mariner" series is reproduced on a small scale; this series of outline plates is one of the best things Sir Noël Paton ever did. But we fear we cannot be persuaded to think him a great artist.

The *Studio* has an interesting and enthusiastic article on a really great artist, Puvis de Chavannes, by M. Gabriel Moury, whose analysis of Chavannes' work and its aims is very thoughtful, and worth reading carefully. The article is illustrated by reproductions, both from his finished works and from his studies.

The *Fortnightly* contains an article by Mr. John Brett on "Landscape at the National Gallery," going into the merits and demerits of the principal classes of landscape in the National collection. Mr. Brett's outspoken opinions on Claude, Both, Ruysdael, &c., will astonish the respectable mediocrity who frequent the National Gallery, but they are not far from the truth in most cases. We should say that Mr. Brett underrates Claude very much, though we agree with all that he says about Both, Ruysdael, Cuyp, and Hobbema. When he says that Gaspar Poussin was an artist in composition, but "knew nothing about trees," surely we should have expected the same criticism as to trees to be applied to Gainsborough, who painted trees on what may be called the Gainsborough model. However, Mr. Brett's criticisms in the main are both wholesome and amusing reading, and may open the eyes of some of the public.

The *Nineteenth Century* contains an article by the Count de Calonne on "Domestic Architecture in Paris," which is of considerable interest. In the course of it the writer discusses the relative advantages and disadvantages of the Paris "flats" system and the London single house. Architecturally he is decidedly in favour of the former, arguing that it is much better to have a fine block of building with one entrance which can be treated with architectural dignity, than a row of smaller houses with ten entrance doors which are generally all alike and cannot receive much architectural treatment. In other more practical respects he considers the Paris system has many drawbacks, of whom the *concierge* is the greatest. It appears that a little while since there was a move in favour of the self-contained house in Paris, which was checked by the discovery that it was much more assailable by burglars than the mansion in charge of a *concierge*. The article contains a great deal of interesting information and criticism in regard to the architectural treatment of Parisian houses. The same magazine contains an article by Sir John Lubbock on the London water companies question, warning the public against the enormous expense which would be incurred in buying up the companies, and suggesting in conclusion the compulsory appointment, on the board of each company, of one director nominated by the Government, one by the London County Council, and one to represent any outside county supplied by the company.

In *Scribner* the serial article on American wood engravers deals with the work of Mr. W. B. Closson. This artist has been experimenting with a new method of treating the wood-block surface (not described), by which he claims to have produced effects of a breadth and facility of treatment approaching etching. The engraving of a portrait, given as an illustration in the article, is remarkable for its softness of tone and texture.

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* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

† That sentence may be American, but it is not English.

In the *Century* is an illustrated article on some of Tesla's recent electrical work. The serial article on old Dutch masters, by Mr. Timothy Cole, deals with Ferdinand Bol, and is illustrated by an engraving from one of his portraits. "A New Field of Travel" (II.) by Miss H. W. Preston, treats of Spalato as it now exists, illustrated with a good many sketches by Mr. Pennell.

Harper includes two illustrated topographical articles, "Venice in Easter," by Mr. Arthur Symons, with illustrations by Mr. Guy Rose, and "Autumn in Japan," by Mr. Alfred Parsons, with twenty-one illustrations by the author, all of which are charming, and give a vivid idea of Japanese landscape.

In *Blackwood's Magazine* the friends of a late eminent archæologist, as well as others, may be interested in an article entitled "In Mitylene with the late Sir Charles Newton."

The *London Home*, a monthly magazine which we confess not to have heard of before, has been sent to us, and contains a sketch and description of a design for a London home, by Messrs. Baillie Scott and Seton Morris, the title of which is rather a misnomer, as it evidently means a house outside—very much outside—of London; a small detached house with trees round it, with steep roofs and a half-timber upper story. That looks picturesque, but it is not the way to make the most wholesome or comfortable house on a small scale, though it is no doubt economical, and it is intended that the house should be built for 800*l*. The plan is rather too in-and-out and full of small corners, the pantry as a passage to the kitchen is not a very convenient arrangement, and we should have liked to have seen a scale to the plan. Plans of picturesque small houses without scales attached are sometimes rather deceptive as to the real size of the rooms.

The *Engineering Magazine* (New York) contains an article by Mr. Barr Ferree on "Recent Architecture in France," with a number of small illustrations reproduced from photographs. The printers seem to have made some blunders, as "Musée Galliara" for "Galliera," and "M. Ledille" for "M. Sedille," which cannot be the fault of the writer of the article. Mr. Ferree thinks that while there is much that is good in current French architecture, much that is fine, and some things that are great, "the actual buildings do not come up to the standard of the school work itself," and that with such a costly system of architectural education maintained by the Government, the result should be something more than an occasional fine building. Some critics on our side of the Channel would perhaps say that is exactly in consequence of this elaborate State education that there are (if it be so) few fine modern buildings in France. On the other hand, the system of education shows its results, to our mind, in a general high level of architectural design which cannot be ignored. As for great buildings, the few that strike one as works of genius, no system of education can produce those; but it is something to have a system which maintains a general fairly-high standard, and perhaps France alone can boast of that at present. In the same magazine is an article which excites rather melancholy reflections, on "Water Powers of the Western States," illustrated with a number of views of perfectly exquisite bits of romantic water-fall scenery. Alas! from henceforth this is only "water-power."

In the *Pall Mall Magazine* Mr. Walter Besant's essay on Westminster (Chap. VIII.) deals with "the streets and the people," but is also illustrated by many good and interesting sketches by Mr. W. Patten, including a number of sketches of the grotesque animals on the exterior of Henry VIII. Chapel, of the existence of which, and of their peculiar style, many people are hardly aware. To the same magazine the Countess of Cork contributes a pleasant article on "The Chronicle of a Street," viz.: Charles-street, Berkeley-square, in which the writer lives; it is accompanied by some excellent sketches by Mr. F. Masey.

The *Monde Illustrée* contains an article by Mr. E. Neukomm on the life and works of M. Alexandre Struys, the Dutch painter, whose powerful talent is illustrated by engravings of two or three fine works. M. Paul Wiriath contributes an article on the "Association Générale des Etudiants de Paris."

The *Gentleman's Magazine* contains a short article on "Giant Telescopes" by Mr. J. E. Gore. In the course of it he records the opinion of Mr. Alvan Clark, that in spite of the greater absorption of light by the thicker lenses in large telescopes, the powers of the instrument increase in greater proportion with the increase in diameter of lens than the absorption by the lens; that the 30-in. object-glass which he made for the Nice Observatory is greatly superior to the 26-in. one at Washington, the 36-in. telescope at the Lick Observatory superior to the 30-in., and he expects his new 40-in. one to be superior to either. Remembering the time when it was considered a great thing to have achieved a successful 12-in. object-glass, this progress in surmounting obstacles is remarkable.

The *English Illustrated* contains an account of a visit to Mr. William Morris's printing-room at Kelmscott House, with a view of the house and portraits of Mr. Morris and his daughter, also a reproduction of a page of the Kelmscott edition of "Maud," very decorative to look at, but with the words printed straight on instead of being arranged in lines, a misuse of the art of ornamental page-making against which we have before protested. Artists may like the effect of the page, but poetry is after all for reading, not for decoration, and no lover of poetry wants to read "Maud" in that form. Poetry is verse, and ought to be printed so. Printing a book thus is making the contents of the book of less importance than the setting, which is absurd.

CARPENTERS' HALL LECTURES:

WOOD-CARVING.

THE last of the series of lectures on matters connected with building arranged by the Worshipful Company of Carpenters was delivered at Carpenters' Hall, London Wall, on the 3rd inst., by Mr. W. R. Lethaby, on "Wood-Carving."

Mr. Nieman Smith, the Master of the Company, presided, and apologised for the absence of Sir James C. Lawrence, who was to have occupied the chair, and of Mr. H. Heathcote Statham, F.R.I.B.A., who was to have lectured on "Natural Foliage and its Treatment in Woodwork," but was prevented by press of work from doing so.

The lecturer—whose remarks were illustrated by some small groups, a figure of Late Gothic work, some casts of thirteenth century misericords, &c.—said he had made no attempt at a balanced and consistent treatment of his subject, but had merely set down some notes on points which had especially interested him, whether historical, practical, or speculative. It was particularly interesting to inquire what relation the arts usually called ornamental bore to one another and the fine arts before an audience of architects and practical men, and it was because he wished to be really practical that he did this. It seemed to him that all instruction in the arts of design must be taught experimentally, tool in hand, and that all their talking over their subject could do was to suggest a mental aspect—the atmosphere, as it were, which surrounded production. He would encourage effort, stimulate questioning, arouse curiosity to gaze over the great panorama of life and art which history unrolled before them; and he would incite to an examination of the chains of custom which bound them in regard to the arts. First he wanted to ask not so much how they should carve in wood, but why they should carve it at all. Fortunately, there was no room for misconception as to the purpose and contents of the art now under consideration. There was no excuse of utility nor compulsion under building and sanitary Acts, which they might urge if they failed, of the one and only purpose of decoration. Let them start by fairly acknowledging that wood-carving was perfectly useless—even less than useless. If it were not beautiful—interesting to the beholder, and a delight to the worker—what should justify it? If their wide and accurate knowledge of past art had been one of many causes for their present sterility in production, this he believed, should be rectified, not by their seeking to forget the past, but by their seeking another point of outlook, a larger view, and the re-combination that followed minute analysis. He who, at this time, knew best what the constant spirit of past art had been, knew best what its future would be. Let them not study Greek as Greek, nor Gothic as Gothic, but see in them only phases of the one universal art. So far as they studied past art let them classify their observations in structural and artistic categories, and not according to geography or chronology. The one would prove a knowledge *of* art; the other a knowledge *about* art. By way of history he proposed to speak of only two periods when stories and ideas were cut into wood: of the Greek period, because so much superstition was still felt for Greek art as something apart especially refined and civilised; and of Gothic in England, for there they found the thoughts of their own race in its first maturity and enthusiasm. The earliest figure sculpture was wholly or very largely of wood, and the oldest statue in the world now rested in the Cairo Museum. An Egyptian statue of wood might also be seen in the British Museum, but this was much later work. In Greece the log statue not only left a legacy of style which might be recognised in the early stone figures; but a great number of the primitive statues of wood remained in the temples throughout the periods of the culmination and decay of Greek art. The Greeks, indeed, in a special way, seemed to have had the historical sense, and to have reverenced the art of their fathers, allowing the brick and timber temple to stand side by side with the marble one, and the primitive log statue with that of ivory and gold. Having referred in some detail to old Greek figure-sculpture of wood, the lecturer said that carving was doubtless much used in adorning structural timber work and furniture, although inlay of ivory, pearl, and metal seemed to have been a more favourite method of decorating wood-work. Coming to our own land and our own tradition, Mr. Lethaby remarked that, in wood-carving, work was done here, and in part remained to us, having a particularly national character, and in beauty second to no other. Indeed, in certain forms of decorative art we had led the world. Referring to some of the treasures wrought by great artists—yet simple craftsmen wood-carvers—of the Romance period, he said the earliest ornamental woodwork which remained to us were the crumbling fragments of St. Cuthbert's coffin, preserved in the library of Durham Cathedral. This coffin, which was probably that in which the Saint was buried in 698, was covered with incised patterns executed with a knife. These carvings represented the Virgin and Child, with apostles, saints, and the symbols of the four Evangelists, their names being inscribed in Saxon characters. Of the first half of the thirteenth century there was the magnificent set of misericords belonging to the stalls at Exeter Cathedral, and of the earliest fourteenth century they had the superb carvings at the back of the choir-stalls at Winchester. At the opposite extreme as to manner of workmanship, but still of fourteenth-century work, they had the Warwick violin, lately shown at the Grafton Gallery, and of which a reproduction might be found at South Kensington. Another quite matchless piece of work of the same century was a panel, of oak—lately acquired at South Kensington Museum—some 5 ft. by 2 ft., displaying the combat of St. George with the Dragon, in three scenes, which were interwoven in one continuous design. Having alluded to the hundreds of examples of misericords of the fourteenth and fifteenth centuries which remained in the choirs of our great churches, such as Gloucester, Hereford, Worcester, Winchester, New College Chapel, Chester, Carlisle, and Norwich, the lecturer said the most accessible and (though late) astonishingly minute and interesting set of misericords were those in Henry VII.'s Chapel at Westminster. Ornamental wood-carving of the fifteenth century might be found in every church which had not been too completely restored, from the churches of the Land's End to those of the Eastern Counties and the North. In one they would find seat-ends and a screen; in another a pulpit, lectern, or chest; in a third roof bosses and carved roof timbers. In England there were but few examples of wood statues of the Middle Ages now existing. There was the thirteenth-century effigy of Robert of Normandy at Gloucester, and a fourteenth-century Bishop at Canterbury. Unfortunately, the great imagery of the roods had almost wholly disappeared in England, and we could not bring forward anything to equal the great crucifixes of the thirteenth century, such as might be found in France or Germany. Our roofs, however, were quite populous with angels, some of them, like those at Blythborough, being extremely fine. We had, he believed, no recognisable remains of wood reredoses such as the great painted and gilt erections in Germany, fine examples of which might be studied in South Kensington Museum. In the sixteenth century there was a great and sudden change in the purpose and aspect of the arts; they were not from this time required so much for the common church. But private patrons, who had seen Italy, talked of the antique, and scholarship began to take the place of feeling. The worker ceased to be a thinker. Then, with the completer farming of labour, general production became much less amusing, and free art was no longer required, or indeed allowed, in our buildings by the new architect, who was no longer a builder, but a man of taste. Every-day work fell to a Russell-square level—

far from the lowest possible — and picture-shows were invented. In the sixteenth century the sense of beauty began to fade out from the workmen's purview and covenanted accomplishments. Still, in the seventeenth and eighteenth centuries some decorative sense remained which was truly expressive, although not expressive of the highest things—life, romance, nature were not attainable, but a sense of the ornamental lingered on, especially during Elizabethan and Jacobean times, while master builders and architects allowed the fancies of the workmen house-room. Urging his hearers to look on past art to find there only incentive and stimulus, and not a set of rules and forms paralyzing their own thought, and endeavour—as had been the case the last 300 years—the lecturer turned to some considerations in regard to design. The range of carving, he said, varied from the mere outline of incised work up to the "agreeable bossiness" of full relief. Apart from subject, carving must present them with an agreeable abstract arrangement in the interchange and graduation between light and dark. In a fine work there were no flat surfaces, no mechanical finish; all was swift free painting with the tool. Breadth must be kept in mind; there must be a sense of their big surface containing all the little surfaces. This sense of breadth must be maintained in the group, or statue, as well as in the relief; that was in the finished work they must still be able to feel a suggestion of the original lump or log of timber. Mr. Lethaby proceeded to suggest the great range of treatments that were open to the carver, some so simple that the merest beginner could handle them successfully with a plank and two tools; others, so difficult that an able sculptor might fail, and now unassisted by tradition, certainly would. Mentioning that gilt ornamental carving, other than figure work, had been most largely used for picture-frames, he observed that the picture-frame might well be reformed by somebody seeking a virtuous calling — some 30,000*l.* or 40,000*l.* must be annually spent in the tawdry makeshifts for the London picture shows. He next alluded to the increased facilities which now existed for learning how to set about carving wood and obtaining practice in the use of tools. Schools entirely practical, like the fine schools of the Carpenters' Company in Great Titchfield-street, and the other Polytechnics offered opportunities which should be more widely known and more largely used by the young craftsman in supplementing and forestalling the results of his daily practice. In further remarks he trusted the mere fashion of ornamentation was going out of vogue. Unless they could get ornament, thoughtful, personal, bright, and sweet, they were infinitely better off without it. "Beyond the twenty hireling styles," he said, "cultivate a twenty-first—your own. Or, better still, forget the styles and find yourself. The mission of the carver in wood is not to cut meaningless sinuosities of line or undulations of surface. His part is to observe, feel, express. All art may be defined as the science of feeling and of stirring feeling in others." Towards the close of his lecture Mr. Lethaby remarked that there was a tendency to ridicule the idea that it was necessary for design and craftsmanship to go together, but in such an art as wood-carving this was, he believed, accurately true. He could not remember, he added, any piece of wood-carving that had interested him where the design had not been the workman's own. Finally, in regard to our own contemporary and future style, he expressed dissent from such of his friends as called it eclectic. He inclined to the refusal of all labels. Naturalism would not do unless it was stretched to cover the crudest abstraction, nor Realism, unless it included the uttermost of Romance, nor Humanism which suggested scholarship and had been limited by association with the Renaissance. But if a name must be found it should be wide enough to include all these together and to cover the whole ground between the four cardinal points of art—Nature, tradition, requirement, material. Might the builders and craftsmen amend the Impressionist art of the painters into Expressionist!

The Chairman, in proposing a vote of thanks to the lecturer, mentioned that in many churches in the Eastern Counties there was an immense mass of carved wood-work which would instruct them in true art. He then directed attention to the competition in wood-carving to be held in June, and said that in connexion therewith prizes of gold, silver, and bronze medals, and money, would be offered to members of the trade, amateurs and students, including ladies.

The lecturer briefly replied, and the meeting terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Mr. Arthur Arnold, Chairman, presiding.

The Water Question.—Mr. Benn, M.P. (Vice-Chairman), moved:—

"That, in the opinion of the Council, it is desirable that the Parliamentary Committee should press forward in Parliament the London County Council Bills for the purchase of the Lambeth and the Southwark and Vauxhall Water Companies with all possible speed."

He submitted that the motion was distinctly of a non-party kind. The resolution referred to only two companies, but they were companies working under the least favourable conditions, and their operations covered a complete area which could be conveniently dealt with. Sir John Lubbock had put upon the paper an amendment to the motion, but in 1891 Sir John expressed the opinion that the Council was the proper body to control the water-supply, and that the enterprise would, in his opinion, prove remunerative. Birmingham owned its water-supply, and the result was that though the supply had been doubled, the cost had been reduced. The same sort of thing could be said of Liverpool, Leeds, Bradford, Belfast, and many other places.

Major Probyn seconded the resolution.

Sir John Lubbock, M.P., moved the following amendment:—

"That before assenting to the Water Bill, now before Parliament, the Finance Committee be instructed to report to the Council as to the probable effect upon the rate of the purchase of the water companies in the manner proposed in the Bills now before Parliament having regard to the resolution of the Council with reference to the necessity for an additional source of supply, and on the basis of repayment in the maximum period of sixty years."

After observing that he agreed that the question was a non-party one, he said he had never spoken in favour of the purchase of the undertakings of the water companies, though he had expressed himself in favour of the establishment of a new supply, and in favour of municipal control. He thought there would now be no doubt that 50,000,000*l.* was well within the sum that would be involved in the purchase of the companies' undertakings. Much was said about the late frost, but what had been the result of that visitation? The companies would now be put to the heavy cost of laying their mains at a lower depth; but if the companies had been purchased last year, that heavy cost would have had to be borne by the ratepayers.

Mr. Joseph Dimsdale seconded the amendment.

Mr. Beachcroft thought, having regard to the fact that the Council had jurisdiction over only 120 square miles of the 845 constituting the water area of the various companies, that the Moderate party was justified in their demand for more information.

Alderman Ritchie remarked that the Moderates were not opposed to the Council's Water Bills, provided they received the information that was necessary to enable them to judge whether those Bills were in the interests of the ratepayers of London.

On a division there voted: For the amendment 49; against it 67. A division on Mr. Benn's motion was then taken, with the result that 66 voted for it and 30 against.

Sanitary Condition of Bethnal Green.—The report of the Public Health and Housing committee contained the following paragraph:—

"Complaint having been made by the Bethnal Green Sanitary Aid Committee of the Mansion House Council as to the alleged inadequacy of the sanitary staff of the Vestry of Bethnal Green, we decided, after correspondence with the Vestry, that the Medical Officer should report upon the sanitary condition and administration of the parish. An inquiry was thereupon made by Dr. Young, assistant Medical Officer of Health, and the Medical Officer in submitting to us Dr. Young's report, which discusses in detail the character of the district, points out that whereas in London as a whole there is one sanitary inspector to some 20,000 inhabitants, in Bethnal Green there is one sanitary inspector to some 25,000 inhabitants. But, while the staff of inspectors in Bethnal Green is below the London average, if the district be compared with other districts in London in respect of conditions which make claim on a Sanitary Authority, it is found that these conditions more abundantly exist in Bethnal Green than in most other London districts. Thus the persons inhabiting one or two rooms constitute in Bethnal Green a larger proportion of the population than they do in two-thirds of the districts in London. The Medical Officer is satisfied, therefore, that the advice given by Dr. Young that another inspector should be forthwith appointed, raising the total number of inspectors employed to six, deserves the approval of the Council. Beyond this the Medical Officer adds that his own experience of the district, obtained by a detailed inspection in 1887, and by familiarity with its conditions since he has held his present office, leads him to the conclusion that this number of inspectors, with sufficient clerical assistance, is the very smallest which will suffice for the administration of the district. The need of accommodation for persons during the disinfection of their rooms is also properly insisted upon by Dr. Young."

Other business having been transacted, the Council adjourned until after Easter.

Illustrations.

IZAAK WALTON MEMORIAL WINDOW, ST. DUNSTAN'S, FLEET-STREET.

THIS window, which has been erected as a memorial to Izaak Walton, in the church of St. Dunstan-in-the-West, was unveiled on Friday last, by Mr. W. Baily, the Master of the Ironmongers' Company, of which Walton was a member nearly 300 years ago. It has been designed and executed by Messrs. Percy Bacon & Brothers.

The centre light of the window contains a full-length figure of Walton, which is a portrait; and a smaller panel shows him seated at his library-table, surrounded by books and trophies of his art. The two side-lights contain portraits of men whose lives he wrote, and of his great friend Thomas Ken, the author of the Morning and Evening Hymns. At the top of the left-hand light is Sir Henry Wotton, with his coat-of-arms, and a view of Eton College, of which he was at one time Provost. Lower down is Bishop Ken, and an elevation of Wells Cathedral.

In the lowest panel is George Herbert, the poet, and his church at Bemerton, depicted on a shield. At the top of the right-hand light is Dr. Donne, Dean of Old St. Paul's: beneath him is the judicious Hooker, and his delightful little church in Old World, Barham, near Canterbury. The third panel depicts Bishop Sanderson.

Angels in the tracery hold scrolls of the Virtues. In the two side quartrefoils are blazoned the arms of St. Dunstan and of the Ironmongers' Company. Walton was a member of the latter and overseer of St. Dunstan's parish. The centre quatrefoil contains the intertwined monograms of Izaak Walton and Charles Cotton.

The putting up of the window has been partly due to the exertions of Mr. R. B. Marston, the editor of the *Fishing Gazette*, who suggested the scheme of the design, and has acted as Hon. Secretary and Treasurer to the memorial fund.

COMPETITION DESIGN FOR NEW BANK, HALIFAX.

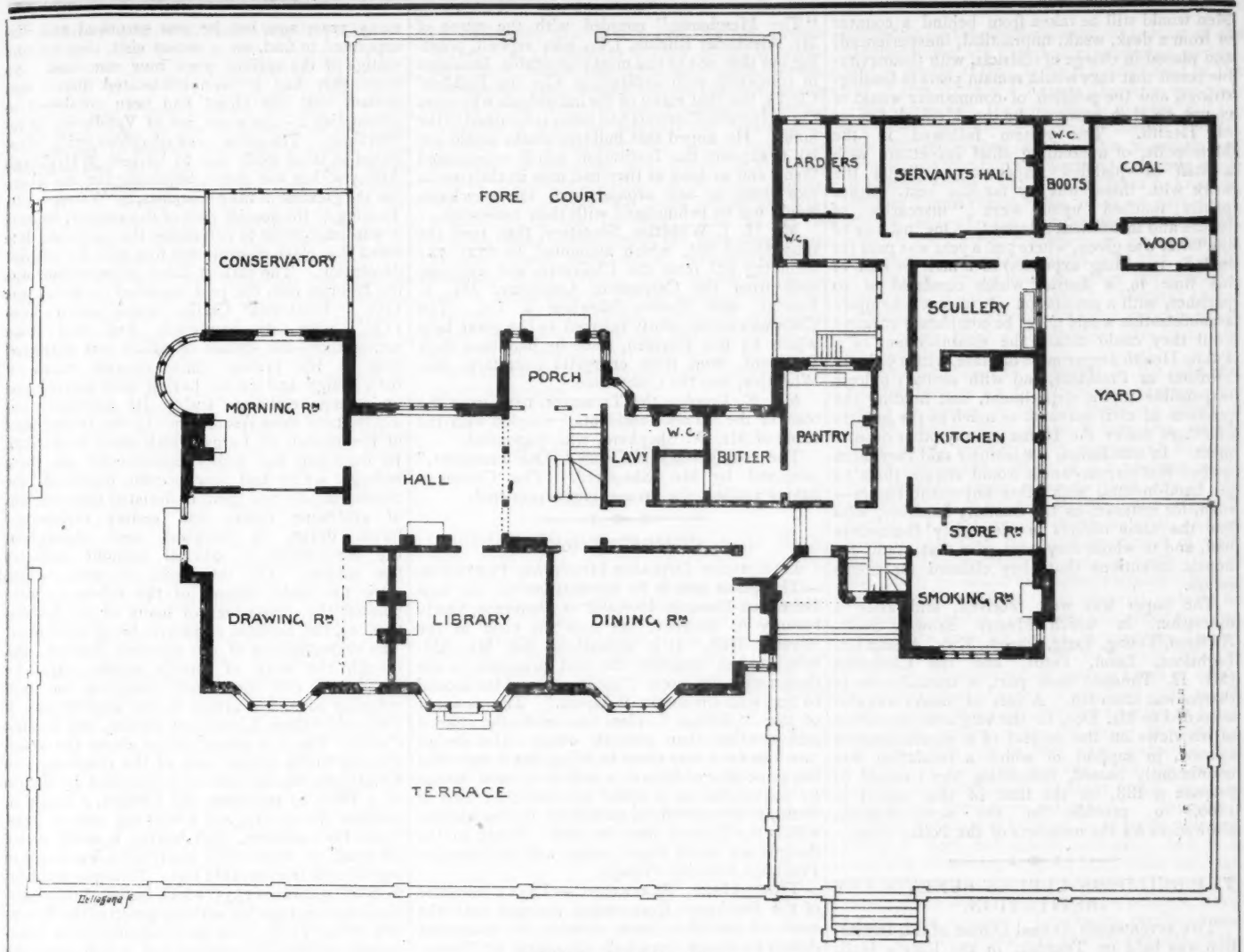
THIS is a design submitted in the recent competition for a new bank for the Halifax and Huddersfield Union Banking Company. It is by Mr. Herbert Athron, architect, of Doncaster. There seems to have been a reluctance to give competitors or the public any definite information as to the result of the competition, beyond returning their drawings to them. We publish this one because it shows some originality and novelty in the architectural treatment of a bank; and perhaps its publication may tend to elicit a little more information as to the competition.

It was intended that the walls should be faced with worked Huddersfield stone, with brick backing, the plinth being grey granite, and the columns red polished granite. The walls of the entrance to be enriched with faïence. The walls of the banking hall to have a panelled oak dado, with coloured marble panels above, the arches and cornices being in faïence. The roof of the low buildings would have been of fire-proof concrete, with Val de Travers asphalte covering; the roof of banking hall and entrance boarded and covered with lead. The estimated cost of the building, according to the architect's report sent in with the drawings, was 15,353*l.*

MANSIONS, GREAT RUSSELL-STREET.

THESE buildings stand upon the site of eleven houses previously existing opposite the British Museum, and of a similar number facing Gilbert-street at the back.

The whole of the buildings, although intended to be erected at different times and for separate leaseholders, and consequently varying considerably in plan, are united in the one complete



"Abbot's Leigh."—Plan.

block design, the centre of which is now being carried out.

The arrangement of the plan generally is that of spacious internal courtyards with central staircase, and lifts placed between the front and back buildings, and so available for both. The trades entrances are at the back, connected with the basements only, and there is no other entrance into that street. Thus, some of the chief banqueting, billiard, and other rooms of a private hotel, and also many of the flats and residences, are able to derive their light and air direct from Gilbert-street facing south.

The construction is generally fire-resisting, the floors being by Homan & Rodgers, throughout composed of iron pottery and cement concrete. Portland-stone alone is used for the front and elsewhere, generally with red brick, some of it ornamental.

The chief features in the design are the oriel and bay windows projecting at the first floor level, and carried up some two, and others three stories higher.

The aim of the architect has been to give a dignified air to buildings which require ample windows, balconies, and projections necessary for the cheerful occupancy of first-class dwellings such as these, in floors and flats.

The position opposite the British Museum secures a grand open space in front, with ample light and air, and an outlook somewhat different from the mere side of a street.

The architect is Mr. C. Forster Hayward, and the drawing we reproduce was exhibited at the Royal Academy last year.

ABBOT'S LEIGH, HAYWARD'S HEATH.

THIS house is built on the edge of the high ground lying to the east of Hayward's Heath, and overlooks the wide valley that stretches to the Brighton downs. The principal rooms are consequently all arranged to face the south, except the morning-room, which is to serve also as a painting-room.

The house is built of brick, faced with red brick, with dressings of stone from the neighbouring quarries at Skeyne's Hill. The upper part of the garden front is rough-cast in moulded panels. The chief feature of the interior is the hall, which, with the principal staircase, is carried up through the two stories, an arcaded passage running round three sides to give access to the various rooms, the porch also being taken up the whole height of the building to afford space for the half-landings.

The drawing shows the house as it has been executed, with the exception of the terrace, which has ultimately been laid out level from end to end.

The architect is Mr. F. C. Lees, of London. The drawing was exhibited at the last Royal Academy exhibition.

The plan of the house is appended; that there is no scale to it is the fault of the architect, who sent it to us without any.

HOUSE AT RUDGWICK.

THIS house is built of red brick, half-timber work and red Broseley tiles, and was commenced on a small scale. When, however, the smaller house was nearly completed very considerable additions were made, including a billiard-room, gun-room, servants' hall, dairy, &c., engine-house for the electric lighting, stabling for seven horses; a pair of cottages, forming a lodge, and large vineries, greenhouses, winter garden, &c., were also erected.

The architect is Mr. W. H. Harrison, of Westminster; the contractor, Mr. F. T. Chinchen, of Kensal Green. The plant and electric lighting was supplied by Messrs. B. Verity & Sons, of King-street; and the greenhouses erected by Messrs. Rosser & Russell.

The drawing was included in the last Royal Academy Exhibition.

THE SANITARY INSPECTORS' ASSOCIATION.

AT the April meeting of this Association, held on Saturday last at Carpenters' Hall, London Wall, an unusually large number of new members were elected, several representing Brighton, and others Worthing, Louth, St. Ives, Wisbeach, Southampton, Gloucester, and other important districts. The business on the programme included a paper by Mr. W. H. Grigg (Fulham Board) on "Some Reasons why Sanitary Inspectors do not Occupy their Statutory Position," followed by discussion; a motion, of which Mr. Lightfoot had given notice, proposing a change in the constitution of the Council, which was negatived; and a resolution, proposed by Mr. Dee (Westminster), in favour of a Bill to be promoted in Parliament embodying a superannuation scheme for sanitary inspectors. It was also announced that the President of the Local Government Board had consented to receive a deputation from the Council of the Association on the subject of its claim to be represented on the new examining board proposed for sanitary inspectors.

Amongst the principal hindrances in the path of the sanitary inspector, Mr. Grigg placed want of unity, the presence among their body of incompetent men, and, above all, the attitude taken up by some of the medical officers of health towards sanitary inspectors. Some of these gentlemen, not content with performing the important duties assigned to them, assumed a position of domination over the sanitary inspectors which amounted in not a few cases to absolute oppression. They all knew the opinions of one leading Medical Officer of Health, who enjoined his brethren always to remember that "the Medical Officer of Health was the Chief Sanitary Inspector." They were told by Dr. Willoughby in the "Health Officers' Pocket-Book" that the Officer of Health "must claim the subordination of the sanitary inspectors, who should act under his orders, report to him, and through him to the Board." It was not merely that the unwisdom and wastefulness was to be deprecated of allowing highly-paid officers to neglect their scientific duties, in order to undertake those more mechanical duties which fell to the sanitary inspectors, and which were efficiently performed by them at one third, one fourth, or one fifth of the medical officer's salary. This movement was especially mischievous, because of its tendency to perpetuate the bad old system of appointing as sanitary inspectors men who had no proper qualifications for the position. The post of sanitary inspector would again be regarded—as in some benighted places it still was regarded—as a position into which influential members of Local Boards could "job" acquaintances or relatives whose most essential qualification might be the ability "to do nothing successfully."

Men would still be taken from behind a counter or from a desk, weak, unpractical, inexperienced, and placed in charge of districts, with the inevitable result that they would remain years in leading-strings, and the position of commander would of course be then assumed by the Medical Officer of Health. The system followed in the Metropolis, of appointing chief inspectors with a staff of qualified inspectors to divide the work with them, was by far the best. Other points touched upon were "insecurity of tenure and insufficient salaries." One instance of the latter was given, where 70*l.* a year was paid (to include travelling expenses) to a man for part of his time in a district which consisted of 40 parishes, with a population of 30,000. Sanitary administration would never be completely effective until they could obtain the establishment of a Public Health Department of State, with a Cabinet Minister as President, and with sanitary officers responsible to the department, and holding the position of civil servants as much as the holders of offices under the Home or any other department. In conclusion, the lecturer said they often wished that circumstances would enable them to go hand-in-hand with other important bodies—such, for instance, as the Sanitary Institute, who had the same objects in view they themselves had, and to whom they must give that credit for honest intentions that they claimed for themselves.

The paper was well received, and after a discussion, in which Messrs. Brown, Scott, Addison, Young, Legg, Quelch, Kirk, Alexander, Lightfoot, Leon, Petitt, and the Chairman (Mr. H. Thomas) took part, a cordial vote of thanks was accorded. A vote of thanks was also accorded to Mr. Dee, for the very able exposition of his views on the subject of a superannuation scheme, in support of which a resolution was unanimously passed, instructing the Council to prepare a Bill, on the lines of that passed in 1890, to provide for the superannuation allowances for the members of the Police Force.

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE seventeenth Annual Dinner of this Institution was held on Tuesday, in the King's Hall, Holborn Restaurant, Mr. Charles Wall, President, in the chair. The company numbered 252, among those present being Messrs. William Shepherd, Robert Freeman, A. Ritchie, R. Downs, B. Nightingale, E. Brooks, and Captain E. C. Roe.

The usual loyal and patriotic toasts having been duly honoured,

The Chairman proposed the toast of the evening, "The Builders' Clerks' Benevolent Institution." He said that their Institution was doing a good work, since it helped to support those builders' clerks who, through no fault of their own, had been unfortunate in life. The Institution had been in existence twenty-nine years, and was founded for the purpose of granting pensions of £25 per annum to necessitous clerks, and of £20 per annum to their widows, and for the maintenance and education of their orphan children, and for making grants of temporary relief. In the course of an earnest appeal for support for the Institution, the Chairman said that the income for last year had amounted to £808, the total being made up of £227 6s. 6d. in annual subscriptions, £326 in donations, £128 in dividends, and £125 moiety of legacy bequeathed to the Institution by the late Mr. Thomas Robinson. Pensions to the amount of £340 had been paid, as well as £36 10s. in sundry grants for temporary relief. An Institution which not only assisted unfortunate clerks, but their widows and orphans was, he considered, deserving of every sympathy.

Mr. W. R. Freeman, past President, then proposed the toast of the "Architects and Surveyors." In his opinion, he said, it was most desirable that builders' executives should come in touch with architects and surveyors, and he knew that architects had great sympathy with the work that they, as an Institution, were carrying on, yet he regretted to say that no representative of that profession was present that evening, though they had a gentleman representing the surveyors, Mr. Campbell, whose name he coupled with the toast.

Mr. Campbell having responded,

Mr. R. Barratt proposed the toast of "The Master Builders," referring, in the course of his remarks, to the many difficulties which builders had to contend with at the present time. The toast was coupled with the name of Mr. R. Downs, who briefly responded.

Mr. F. S. Oldham then proposed the toast of "The Merchants," coupled with the name of Mr. Alexander Ritchie, J.P., who replied, pointing out that one of the most regrettable incidents in connexion with institutions like the Builders' Clerks, was that many of the individuals who were the recipients of benefits had never subscribed to the funds. He hoped that builders' clerks would not fail to support the Institution which represented them, and so long as they had men in their ranks like those he saw around him, the merchants would not be behindhand with their assistance.

Mr. H. J. Wheatley, Secretary, then read the subscription list, which amounted to 272*l.* 7s., including 25*l.* from the Chairman, and 10*l.* 10s. each from the Carpenters' Company, Mr. J. Randall, and Messrs. Mowlem & Co. The Chairman subsequently referred to the great help which he had received, since he had been their President, from their energetic Secretary, Mr. Wheatley, and the Committee.

Mr. E. Brooks, the Treasurer, next gave the toast of the "Past Presidents," coupled with the name of Mr. W. Shepherd, who responded.

The concluding toast was "The President," proposed by Mr. Shepherd. The Chairman having replied, the proceedings terminated.

COMPETITIONS.

INFECTIOUS DISEASES HOSPITAL, PENZANCE.—The plans sent in for competition for the new Infectious Diseases Hospital at Penzance, nearly seventy in number, are now on view in the Alverne Hall. It is understood that Mr. Aldwinckle has awarded the first premium to the design with the motto "Eclipse," and the second to that with the motto "Aspect." The designer of the "Eclipse" plan has evidently studied utility rather than æsthetic effect. His design provides for a very plain building, but it embodies the principles which are now held in most favour by authorities on hospital architecture; and it could, it is believed, be carried out for the amount which the Council have in view. Some of the designs are much more ornate and elaborate.—Penzance *Evening Tidings*.

TOWN HALL, BLACKPOOL.—The Committee of the Blackpool Corporation charged with the work of selection have decided to adopt the design for a new town hall submitted by Messrs. Woodhouse & Potts, of Bolton, awarding the second premium to Mr. A. Gilbertson, Liverpool, and the third to Mr. J. Lovell, London. The estimated cost of the building is 8,000*l.*

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held, on the 3rd inst., in the Royal Institution, Mound, Mr. W. W. Robertson, the President, in the chair. Mr. John Kinross, A.R.S.A., made a communication on St. Andrew's Priory. He gave it as his opinion that the evidence was amply sufficient to prove that the monastic buildings were commenced after the cathedral building was completed. Mr. Thomas Bonnar read a communication on "Some Notes on the Ancient Mural Decorative Art in Scotland." Dividing the subject into two divisions—the eccleciastical and the secular periods—he said, of the first, that, owing to the ravages which left the ancient religious edifices of our country in a totally ruinous condition, there were only two examples known to him of ecclesiastical coloured work illustrating this phase of art in Scotland. The more important specimen was the groined roof of the crypt of Glasgow Cathedral. That remarkable and highly interesting piece of decorative work, although in a decayed condition, showed by its presence on the roof of that ancient structure—which dated back to the twelfth century—that the interiors of religious houses were highly decorated with ornamental forms, and that the use of rich colouring was prevalent in those early days of the Church in Scotland. The mullions that formed the groined arches of the roof were deeply moulded and filled in with full colouring of red, yellow, and white. The centre bosses were also tinted with similar colours, and there was evidence that the enriched carvings had been overlaid with gold. At the intersections of the groins and at the bases of the arches there were painted on the plastered stone arches richly twining ornamental scrolls representing conventional foliage, the prevailing tint being green. The drawing of the ornament exhibited great precision, while it retained much spirit in the flow of its lines, proclaiming it to be the work of a proficient artist. These particulars were noted many years ago, but he was surprised and disappointed to find, on a recent visit, that not one vestige of the ancient work now remained. So thoroughly had it been obliterated that it was evident that the chisel had been employed to accomplish it—the worst act of Vandalism of recent times. The other proof of colour being introduced on stone work was to be seen in Dryburgh Abbey within the chapel adjoining the one where lies the greatest of the romancists, Sir Walter Scott. Turning to the secular part of the subject, he said it was impossible to determine the probable date when this class of work was first used for interior decoration. The earliest dated ceiling extant was the Nunraw one, the year inscribed on which was 1461. Borthwick Castle, which dated from 1430, with its handsome hall and stone arched roof—the surface of which was plastered over at the present time—showed traces of both design and colour having been carried out on a most elaborate scale. Its treatment and motive bore some resemblance to the timber roof of the church of Largs, which dated from 1636. In depicting the family escutcheons on these ceilings, which had now become historical, the artists had clothed them in floriated compositions of grotesque masks and quaint ornamental forms drawn in freehand, and throughout the composition a satirical humour underlay the motive. On the coats-of-arms, which were the main feature of the schemes, were painted the quarterings of many of our leading families, the medium employed being distemper. The characteristics of the art were Scottish, and though the work of foreign artists might be observable, still they could recognise the individuality of native artists in the architecture of Falkland Palace, Linlithgow Palace, and Stirling Castle. The now empty niches above the grand gateway in the eastern side of the quadrangle of Linlithgow Palace were once occupied by statues of a Pope to represent the Church, a knight to indicate the gentry, and a working man to symbolise the commons, each having a scroll above his head, on which were inscribed a few words of legend now irretrievably lost. That was gathered from the records of 1535, which further showed that these statues, together with the group of the Salutation of the Virgin upon the other side of the quadrangle, and certain unicorns and a lion upon the outer gateway, were brilliantly painted. 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Correspondence.

To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—The opportunity of closing this discussion in your columns, which you offer me, suggests that but small occasion remains for my saying more here. Indeed, the last letter of the local President discloses of its own accord, quite enough indication of the character and "true inwardness" of the whole affair. And except for the necessity which the following makes evident, I should stop here.

The local President, however, selects one building of mine, and gives currency to certain injurious rumours respecting its alleged excessive cost.

If it would be right and judicious for a member of, say, the legal profession to publicly suggest of another, "he employed expensive counsel in the first part of his case, and that is sufficient excuse for our petitioning to take its future conduct out of his hands," or for a physician, with similar delicacy and fairness, to put into print—"he did not entirely cure a certain complicated case, and therefore he does not deserve to get another patient": if those methods would be reasonably tolerated in their respective circles, or anywhere else, then our local President's notions of good form—when taking the responsible office of spokesman for others—might, perhaps, serve to score a point, that is, if his statement about such excessive cost happened to be true. But it is quite untrue; and this contradiction deals, not with some mere quibble of a hundred pounds or so, but with thousands, in the case of each of the sums which he subscribes his name to.

It is clear that this whole affair should go to the Royal Institute of British Architects, for when an allied society (ostensibly placed in a high local position in matters professional) is misdirected, whether from mere blundering or less worthy motives, it becomes a standing menace, instead of an aid, to respectable practice, and its wrong-doing demands a spirited resistance from those who may be injured by it. Hence, I previously directed the local President's attention to the Institute, a possibility for avoidance of graver troubles. But in view of his indecisive handling of that suggestion, I now finally urge him to let no suspicion of evasion stand between him and his duty to the office he holds. Thus the very vexed questions arising from local members' action (publicly declared by myself and others to be unprofessional and unjustified) may perhaps be elucidated for general future guidance and benefit even outside the present case.

EDWIN SEWARD.

Cardiff, April 8th, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—XV.

DURABILITY OF TERRA-COTTA.

MUCH of what has been said respecting the durability of bricks applies also to terra-cotta, but there are certain additional points for consideration. Of necessity greater care is taken in the preparation of the earths of which it is made, than with bricks; and the burning is also carried out with extreme carefulness. It is difficult, however, to lay down any general laws relating to the weathering of the material, as there are so many kinds of it. The statement is frequently made that terra-cotta is well-nigh imperishable, and as proof thereof the present condition of Assyrian and other ancient varieties is often quoted. As well might one point to the ancient Egyptian obelisks, still standing in the land of the Pharaohs, as instances of the durability of hornblendic granite, of which some of them are made. Such materials in such a climate as obtains in the interior of countries bordering on the south-easternmost portion of the Mediterranean are practically unaffected, and so, for the matter of that, is the sun-dried mud of the hut of the *fellâhîn*. Expose the same materials—the terra-cotta, the hornblendic granite, and the sun-dried mud—to the rigours of British climate; how differently they behave. No, it sounds well to quote the durability of ancient terra-cotta made of Eastern earths; but what we want to know is, whether English terra-cotta, made of native soil, and in teeth of keen competition, stands well; whether the English manufacturer, under existing conditions of labour, exactions as to tint, rapidity of delivery, and a host of other impedimenta, turns out durable material? Without being personal, it is impossible for us to indicate which firms make good and durable terra-cotta and which do not.

Terra-cotta may be regarded in the light of a material suitable for the elucidation of what some might be pleased to call art, including groups of figures, flowers, &c.; whilst it may also, on the other hand, merely imply species of moulded bricks and blocks. Some of it is unquestionably very durable, much more so than any of the aqueous group of building stones; but a large proportion is a most unsatisfactory material, and not more durable than the worst description of stock bricks. The selection of suitable earths in the first place no doubt exerts considerable influence on the durability of the material, which no amount of careful firing can altogether displace. Terra-cotta building blocks, as everyone knows, are hollow in the interior. The makers' difficulty is in the employment of certain kinds of earth, mixed together, or rarely of one kind only, which shall shrink uniformly, without twisting or bending when subjected to the firing process. A principal aim is to use raw materials that contract as little as possible, and the precise amount of contraction, however small, must be capable of prediction beforehand. Suppose a block to be made of inferior, or of badly-prepared earth, it does not shrink uniformly, and it is incapable of making a good bond when built up. It is subjected to unequal pressure in the wall by reason of the side of one of its faces, perhaps, being longer than another. Cracks are produced and decay is set up, whilst the general strength of the wall is impaired. The interior of the block frequently being filled with all sorts of rubbish, bound together by not the best quality cement, a great deal of the actual strain in the wall comes on the thin shell of terra-cotta alone—that is, in the construction of a large number of terra-cotta buildings. Any previously hidden, or incipiently developed flaws then make their appearance, and it may be that the facilities thus afforded to percolating moisture tend to decompose the contents of the block, and to bring certain chemical compounds to the surface, promoting decay and disfigurement.

The student must be cautious, however, in discriminating between terra-cotta which is bad by decomposition of its substance throughout, and that which is merely decomposed on a thin surface film. Many manufacturers, anxious to present a good tint, subject the blocks to what is technically called a "dipping" process. In such cases the bulk of the material may be durable enough, but the film due to "dipping" is apt to peel off. The fact is that a specially prepared argillaceous substance is applied to the surface of such blocks, which substance neither expands nor contracts in the same ratio as the shell, when fired. The result is the creation of planes of weakness between the film and the main shell which soon weather out, and the surface becomes mottled by the former peeling off. Where efflorescence takes place the film may be "blistered."

The foregoing observations are not applicable to the best class of terra-cotta. In this the surface of the block is not "doctored" to produce requisite shades of colour—the shell may be broken to test the fact. The tint is produced by firing the prepared earths as a whole, and may be induced by the admixture of colouring ingredients, or, rarely, by the natural raw clays. Such terra-cotta is usually of an extremely durable description, it is not very absorbent, and is proof to the attack of the most powerful acids found in the atmosphere. It does not readily become discoloured, and save in niches, ornamental projections, and the like, any soot that may feel inclined to lodge is washed away by the first downpour of rain. Thus the surface of a terra-cotta building generally looks clean and new, whilst it lacks the beautiful tones characteristic of the weathering of the softer, and often less durable, freestones. We have no desire, however, to institute a rigorous comparison between the

Men would still be taken from behind a counter or from a desk, weak, unpractical, inexperienced, and placed in charge of districts, with the inevitable result that they would remain years in leading-strings, and the position of commander would of course be then assumed by the Medical Officer of Health. The system followed in the Metropolis, of appointing chief inspectors with a staff of qualified inspectors to divide the work with them, was by far the best. Other points touched upon were "insecurity of tenure and insufficient salaries." One instance of the latter was given, where 70*l.* a year was paid (to include travelling expenses) to a man for part of his time in a district which consisted of 40 parishes, with a population of 30,000. Sanitary administration would never be completely effective until they could obtain the establishment of a Public Health Department of State, with a Cabinet Minister as President, and with sanitary officers responsible to the department, and holding the position of civil servants as much as the holders of offices under the Home or any other department. In conclusion, the lecturer said they often wished that circumstances would enable them to go hand-in-hand with other important bodies—such, for instance, as the Sanitary Institute, who had the same objects in view they themselves had, and to whom they must give that credit for honest intentions that they claimed for themselves.

The paper was well received, and after a discussion, in which Messrs. Brown, Scott, Addison, Young, Legg, Quelch, Kirk, Alexander, Lightfoot, Leon, Petitt, and the Chairman (Mr. H. Thomas) took part, a cordial vote of thanks was accorded. A vote of thanks was also accorded to Mr. Dee, for the very able exposition of his views on the subject of a superannuation scheme, in support of which a resolution was unanimously passed, instructing the Council to prepare a Bill, on the lines of that passed in 1890, to provide for the superannuation allowances for the members of the Police Force.

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE seventeenth Annual Dinner of this Institution was held on Tuesday, in the King's Hall, Holborn Restaurant, Mr. Charles Wall, President, in the chair. The company numbered 252, among those present being Messrs. William Shepherd, Robert Freeman, A. Ritchie, R. Downs, B. Nightingale, E. Brooks, and Captain E. C. Roe.

The usual loyal and patriotic toasts having been duly honoured,

The Chairman proposed the toast of the evening, "The Builders' Clerks' Benevolent Institution." He said that their Institution was doing a good work, since it helped to support those builders' clerks who, through no fault of their own, had been unfortunate in life. The Institution had been in existence twenty-nine years, and was founded for the purpose of granting pensions of £25 per annum to necessitous clerks, and of £20 per annum to their widows, and for the maintenance and education of their orphan children, and for making grants of temporary relief. In the course of an earnest appeal for support for the Institution, the Chairman said that the income for last year had amounted to £808, the total being made up of £227 6s. 6d. in annual subscriptions, £326 in donations, £128 in dividends, and £125 moiety of legacy bequeathed to the Institution by the late Mr. Thomas Robinson. Pensions to the amount of £340 had been paid, as well as £36 10s. in sundry grants for temporary relief. An Institution which not only assisted unfortunate clerks, but their widows and orphans was, he considered, deserving of every sympathy.

Mr. W. R. Freeman, past President, then proposed the toast of the "Architects and Surveyors." In his opinion, he said, it was most desirable that builders' executives should come in touch with architects and surveyors, and he knew that architects had great sympathy with the work that they, as an Institution, were carrying on, yet he regretted to say that no representative of that profession was present that evening, though they had a gentleman representing the surveyors, Mr. Campbell, whose name he coupled with the toast.

Mr. Campbell having responded,

Mr. R. Barratt proposed the toast of "The Master Builders," referring, in the course of his remarks, to the many difficulties which builders had to contend with at the present time. The toast was coupled with the name of Mr. R. Downs, who briefly responded.

Mr. F. S. Oldham then proposed the toast of "The Merchants," coupled with the name of Mr. Alexander Ritchie, J.P., who replied, pointing out that one of the most regrettable incidents in connexion with institutions like the Builders' Clerks, was that many of the individuals who were the recipients of benefits had never subscribed to the funds. He hoped that builders' clerks would not fail to support the Institution which represented them, and so long as they had men in their ranks like those he saw around him, the merchants would not be behindhand with their assistance.

Mr. H. J. Wheatley, Secretary, then read the subscription list, which amounted to 272*l.* 7s., including 25*l.* from the Chairman, and 10*l.* 10s. each from the Carpenters' Company, Mr. J. Randall, and Messrs. Mowlem & Co. The Chairman subsequently referred to the great help which he had received, since he had been their President, from their energetic Secretary, Mr. Wheatley, and the Committee.

Mr. E. Brooks, the Treasurer, next gave the toast of the "Past Presidents," coupled with the name of Mr. W. Shepherd, who responded.

The concluding toast was "The President," proposed by Mr. Shepherd. The Chairman having replied, the proceedings terminated.

COMPETITIONS.

INFECTIOUS DISEASES HOSPITAL, PENZANCE.—The plans sent in for competition for the new Infectious Diseases Hospital at Penzance, nearly seventy in number, are now on view in the Alverne Hall. It is understood that Mr. Aldwinckle has awarded the first premium to the design with the motto "Eclipse," and the second to that with the motto "Aspect." The designer of the "Eclipse" plan has evidently studied utility rather than æsthetic effect. His design provides for a very plain building, but it embodies the principles which are now held in most favour by authorities on hospital architecture; and it could, it is believed, be carried out for the amount which the Council have in view. Some of the designs are much more ornate and elaborate.—Penzance *Evening Tidings*.

TOWN HALL, BLACKPOOL.—The Committee of the Blackpool Corporation charged with the work of selection have decided to adopt the design for a new town hall submitted by Messrs. Woodhouse & Potts, of Bolton, awarding the second premium to Mr. A. Gilbertson, Liverpool, and the third to Mr. J. Lovell, London. The estimated cost of the building is 8,000*l.*

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held, on the 3rd inst., in the Royal Institution, Mound, Mr. W. W. Robertson, the President, in the chair. Mr. John Kinross, A.R.S.A., made a communication on St. Andrew's Priory. He gave it as his opinion that the evidence was amply sufficient to prove that the monastic buildings were commenced after the cathedral building was completed. Mr. Thomas Bonnar read a communication on "Some Notes on the Ancient Mural Decorative Art in Scotland." Dividing the subject into two divisions—the eccleciastical and the secular periods—he said, of the first, that, owing to the ravages which left the ancient religious edifices of our country in a totally ruinous condition, there were only two examples known to him of ecclesiastical coloured work illustrating this phase of art in Scotland. The more important specimen was the groined roof of the crypt of Glasgow Cathedral. That remarkable and highly interesting piece of decorative work, although in a decayed condition, showed by its presence on the roof of that ancient structure—which dated back to the twelfth century—that the interiors of religious houses were highly decorated with ornamental forms, and that the use of rich colouring was prevalent in those early days of the Church in Scotland. The mullions that formed the groined arches of the roof were deeply moulded and filled in with full colouring of red, yellow, and white. The centre bosses were also tinted with similar colours, and there was evidence that the enriched carvings had been overlaid with gold. At the intersections of the groins and at the bases of the arches there were painted on the plastered stone arches richly twining ornamental scrolls representing conventional foliage, the prevailing tint being green. The drawing of the ornament exhibited great precision, while it retained much spirit in the flow of its lines, proclaiming it to be the work of a proficient artist. These particulars were noted many years ago, but he was surprised and disappointed to find, on a recent visit, that not one vestige of the ancient work now remained. So thoroughly had it been obliterated that it was evident that the chisel had been employed to accomplish it—the worst act of Vandalism of recent times. The other proof of colour being introduced on stone work was to be seen in Dryburgh Abbey within the chapel adjoining the one where lies the greatest of the romancists, Sir Walter Scott. Turning to the secular part of the subject, he said it was impossible to determine the probable date when this class of work was first used for interior decoration. The earliest dated ceiling extant was the Nunraw one, the year inscribed on which was 1461. Borthwick Castle, which dated from 1430, with its handsome hall and stone arched roof—the surface of which was plastered over at the present time—showed traces of both design and colour having been carried out on a most elaborate scale. Its treatment and motive bore some resemblance to the timber roof of the church of Largs, which dated from 1636. In depicting the family escutcheons on these ceilings, which had now become historical, the artists had clothed them in floriated compositions of grotesque masks and quaint ornamental forms drawn in freehand, and throughout the composition a satirical humour underlay the motive. On the coats-of-arms, which were the main feature of the schemes, were painted the quarterings of many of our leading families, the medium employed being distemper. 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To the Editor of THE BUILDER.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTS' SOCIETY.

SIR,—The opportunity of closing this discussion in your columns, which you offer me, suggests that but small occasion remains for my saying more here. Indeed, the last letter of the local President discloses of its own accord, quite enough indication of the character and "true inwardness" of the whole affair. And except for the necessity which the following makes evident, I should stop here.

The local President, however, selects one building of mine, and gives currency to certain injurious rumours respecting its alleged excessive cost.

If it would be right and judicious for a member of, say, the legal profession to publicly suggest of another, "he employed expensive counsel in the first part of his case, and that is sufficient excuse for our petitioning to take its future conduct out of his hands," or for a physician, with similar delicacy and fairness, to put into print—"he did not entirely cure a certain complicated case, and therefore he does not deserve to get another patient": if those methods would be reasonably tolerated in their respective circles, or anywhere else, then our local President's notions of good form—when taking the responsible office of spokesman for others—might, perhaps, serve to score a point, that is, if his statement about such excessive cost happened to be true. But it is quite untrue; and this contradiction deals, not with some mere quibble of a hundred pounds or so, but with thousands, in the case of each of the sums which he subscribes his name to.

It is clear that this whole affair should go to the Royal Institute of British Architects, for when an allied society (ostensibly placed in a high local position in matters professional) is misdirected, whether from mere blundering or less worthy motives, it becomes a standing menace, instead of an aid, to respectable practice, and its wrong-doing demands a spirited resistance from those who may be injured by it. Hence, I previously directed the local President's attention to the Institute, a possibility for avoidance of graver troubles. But in view of his indecisive handling of that suggestion, I now finally urge him to let no suspicion of evasion stand between him and his duty to the office he holds. Thus the very vexed questions arising from local members' action (publicly declared by myself and others to be unprofessional and unjustified) may perhaps be elucidated for general future guidance and benefit even outside the present case.

EDWIN SEWARD.

Cardiff, April 8th, 1895.

The Student's Column.

BRICKS AND TERRA-COTTA.—XV.

DURABILITY OF TERRA-COTTA.

MUCH of what has been said respecting the durability of bricks applies also to terra-cotta, but there are certain additional points for consideration. Of necessity greater care is taken in the preparation of the earths of which it is made, than with bricks; and the burning is also carried out with extreme carefulness. It is difficult, however, to lay down any general laws relating to the weathering of the material, as there are so many kinds of it. The statement is frequently made that terra-cotta is well-nigh imperishable, and as proof thereof the present condition of Assyrian and other ancient varieties is often quoted. As well might one point to the ancient Egyptian obelisks, still standing in the land of the Pharaohs, as instances of the durability of hornblendic granite, of which some of them are made. Such materials in such a climate as obtains in the interior of countries bordering on the south-easternmost portion of the Mediterranean are practically unaffected, and so, for the matter of that, is the sun-dried mud of the hut of the *fellâhîn*. Expose the same materials—the terra-cotta, the hornblendic granite, and the sun-dried mud—to the rigours of British climate; how differently they behave. No, it sounds well to quote the durability of ancient terra-cotta made of Eastern earths; but what we want to know is, whether English terra-cotta, made of native soil, and in teeth of keen competition, stands well; whether the English manufacturer, under existing conditions of labour, exactions as to tint, rapidity of delivery, and a host of other impedimenta, turns out durable material? Without being personal, it is impossible for us to indicate which firms make good and durable terra-cotta and which do not.

Terra-cotta may be regarded in the light of a material suitable for the elucidation of what some might be pleased to call art, including groups of figures, flowers, &c.; whilst it may also, on the other hand, merely imply species of moulded bricks and blocks. Some of it is unquestionably very durable, much more so than any of the aqueous group of building stones; but a large proportion is a most unsatisfactory material, and not more durable than the worst description of stock bricks. The selection of suitable earths in the first place no doubt exerts considerable influence on the durability of the material, which no amount of careful firing can altogether displace. Terra-cotta building blocks, as everyone knows, are hollow in the interior. The makers' difficulty is in the employment of certain kinds of earth, mixed together, or rarely of one kind only, which shall shrink uniformly, without twisting or bending when subjected to the firing process. A principal aim is to use raw materials that contract as little as possible, and the precise amount of contraction, however small, must be capable of prediction beforehand. Suppose a block to be made of inferior, or of badly-prepared earth, it does not shrink uniformly, and it is incapable of making a good bond when built up. It is subjected to unequal pressure in the wall by reason of the side of one of its faces, perhaps, being longer than another. Cracks are produced and decay is set up, whilst the general strength of the wall is impaired. The interior of the block frequently being filled with all sorts of rubbish, bound together by not the best quality cement, a great deal of the actual strain in the wall comes on the thin shell of terra-cotta alone—that is, in the construction of a large number of terra-cotta buildings. Any previously hidden, or incipiently developed flaws then make their appearance, and it may be that the facilities thus afforded to percolating moisture tend to decompose the contents of the block, and to bring certain chemical compounds to the surface, promoting decay and disfigurement.

The student must be cautious, however, in discriminating between terra-cotta which is bad by decomposition of its substance throughout, and that which is merely decomposed on a thin surface film. Many manufacturers, anxious to present a good tint, subject the blocks to what is technically called a "dipping" process. In such cases the bulk of the material may be durable enough, but the film due to "dipping" is apt to peel off. The fact is that a specially prepared argillaceous substance is applied to the surface of such blocks, which substance neither expands nor contracts in the same ratio as the shell, when fired. The result is the creation of planes of weakness between the film and the main shell which soon weather out, and the surface becomes mottled by the former peeling off. Where efflorescence takes place the film may be "blistered."

The foregoing observations are not applicable to the best class of terra-cotta. In this the surface of the block is not "doctored" to produce requisite shades of colour—the shell may be broken to test the fact. The tint is produced by firing the prepared earths as a whole, and may be induced by the admixture of colouring ingredients, or, rarely, by the natural raw clays. Such terra-cotta is usually of an extremely durable description, it is not very absorbent, and is proof to the attack of the most powerful acids found in the atmosphere. It does not readily become discoloured, and save in niches, ornamental projections, and the like, any soot that may feel inclined to lodge is washed away by the first downpour of rain. Thus the surface of a terra-cotta building generally looks clean and new, whilst it lacks the beautiful tones characteristic of the weathering of the softer, and often less durable, freestones. We have no desire, however, to institute a rigorous comparison between the

natural and the artificial product, each has its own merits and drawbacks.

The durability of terra-cotta is sometimes affected by the careless way in which the cement placed in the interior of blocks is mixed, and by the general inferiority of the cement itself. The latter may under favourable circumstances swell out and crack the shell; such an occurrence, however, is of comparative rarity, and it is often difficult to say whether the flaws might not equally well have been produced by uneven strains in the wall of the building.

Efflorescence.

The cause of the appearance of white incrustations on bricks and terra-cotta which usually go by the name of "efflorescence," is an ever-recurring question. The subject has been carefully investigated on several occasions with reference to a few kinds of both bricks and terra-cotta, but it has never been treated as a whole in detail. Experiments, spread over a number of years, and carried out on the best-known varieties, are badly wanted. So far as the matter has been inquired into, we are able to state that the incrustations are of many kinds, and they are due to various causes. It was necessary to mention this, as the general impression seems to be that they are of one character only, and are due to one cause.

Architects must often have been puzzled when using one class of brick from the same maker to account for the circumstance that it "effloresces" in one locality and not in another. In one building, moreover, the incrustation may be of a fairly permanent character for years, whilst in another it may only be of a temporary nature, but reappearing at intervals. Different sides of the same building may be affected in different degree. Pass a building this week and notice the brickwork literally covered by this unpleasing coat of while substance; and revisit the spot a week hence to notice that not a vestige of the covering remains. The incrustations, therefore, behave in a most erratic manner, and the matter is of sufficient importance to demand the most painstaking scientific investigation.

As might naturally be supposed, all possible combinations of circumstances have been blamed in connexion with the incrustations. The composition of the brick has been taken to task, the method of its burning criticised, the character of the mortar in which it is set terribly stigmatised, the damp foundations complained of, and so on; but one set of combinations of purely local origin, and which is responsible, it seems to us, for most of the mischief created, has never been seriously taken into account. We allude to the chemical composition of the impurities in the atmosphere in the immediate vicinity of the buildings affected, in its effects on the materials mentioned. As the atmosphere differs according to locality, so, it is conceivable, does the character of the incrustation also. Prevailing wind currents assist in the work. Many of our readers have, doubtless, noticed that certain freestones built into an incrusted brick wall, or near by, are covered by the "efflorescence" as well as the brickwork or terra-cotta. Now, it is, of course, nonsense to suggest that the atmosphere has had much to do with it in this case. Its nature in at least two instances that have lately come under our notice in these circumstances is of vegetable origin, the plants resembling "moulds." That is very different from an incrustation of mineral origin, such as is usually found both on bricks and stone, but then the mineral matter is of several kinds and occurs in many forms. Here it may simulate the appearance of the "moulds" referred to, there it is arranged in stellar-like groups, composed of acicular filaments radiating from a central point; frequently it is truly crystalline, the incrustation consisting entirely of crystals, and occasionally it is a powdery amorphous substance. The real state of the covering can only be ascertained by aid of the microscope, and a high power is sometimes required.

The foregoing comprise all the varieties of "efflorescence" that we have been able to examine, but a more extended investigation will most probably show that many other forms exist. We can prove, at any rate to our own satisfaction, that the incrustations may be due to the growth of low forms of plant-life dependent in no way, except for foothold, on the chemical or mineralogical nature of the bricks, terra-cotta, or stone on which they are found; they may arise from chemical reactions set up by local impurities in the atmosphere on the mineral matter of the substance encrusted, producing either pure crystals, or amorphous, earthy dust. The incrustation, when of mineral origin, may be quite superficial in character, rapidly formed and easily washed away by a shower of rain; or it may be of a more serious kind, corroding the surface and apparently entering into the composition of the brick, when it is very difficult to get rid of, and tends to decay, or blister the brick.

As to how far the mortar may exert any influence in causing "efflorescence" we prefer to let that phase of the subject rest for the moment; it is sufficient to note that the kinds of bricks most seriously complained of, are often found to be encrusted before leaving the brickyard, where no suspicion can attach to mortar.

It is a mistake to suppose that all bricks "effloresce," it would appear that those which are hard-burnt are least affected, though we could point to exceptions to this rule where salt-glazing has been used. A vitreous brick, and especially a non-porous one with a comparatively smooth facing is, perhaps, the best all round for resisting the formation, or discouraging the development of incrustations. In the near future it may be shown that bacteria are active agents in the production of these unsightly appearances.

In connexion with this subject of the efflorescence on bricks, see the "Note" on page 278 of this issue.

OBITUARY.

MR. JOHN BUCHAN.—We regret to announce the death of Mr. John Buchan, A.M.Inst.C.E., which took place at Plymouth on March 20. In June last Mr. Buchan found the state of his health necessitated his resignation of the City Engineership of Norwich. Mr. Buchan was a son of the late Captain D. Adye Buchan, R.N., of Plymouth, who formed one of Ross's Arctic Expedition, commissioned to, if possible, find and relieve Sir John Franklin. Mr. Buchan was educated at North Hill Grammar School, and articled in 1873 to the late Mr. Robert Hodge, C.E., Borough Engineer of Plymouth. On the expiration of his articles he was appointed on the staff of the Borough Engineer of St. Helen's, Lancs., and later as Assistant Borough Engineer of Plymouth, which appointment he resigned to become Borough Engineer of Grimsby. In 1892 he was elected City Engineer, Architect, and Surveyor of Norwich. He was buried at Plymouth Cemetery on the 23rd ult. At a Council meeting, on the 26th ult., of the Norwich City Council, on the motion of the Mayor, it was resolved that a letter of condolence should be sent to the relatives of the late Mr. Buchan.

GENERAL BUILDING NEWS.

BATHS AND WASHHOUSES, SOUTHWARK.—New baths and washhouses in Lavington-street, Southwark, were opened on the 6th inst. by Sir F. Wigan. The buildings have been erected from the designs of Mr. F. B. Smith by Messrs. D. Charteris & Co. The first-class swimming-bath has a water-space of 100 ft. by 30 ft., with a gallery round. The dressing-boxes are divided by slate slabs. The depth of the water is graduated from 6 ft. 6 in. to 3 ft. 6 in., as in the second-class bath, which has a water-space of 70 ft. by 30 ft. First and second-class private baths are also provided. There is accommodation for twenty-four washers in the washhouses, and each woman has a compartment with three sub-divisions. The first-class swimming-bath is fitted with a portable floor, carried on trestles, thus providing a hall, capable of seating 1,200 persons, for meetings, entertainments, &c., during the winter months, when not in use as a bath. The cost of the building, which covers an area of 16,260 superficial feet, with fittings, is 30,000*l.*

SCHOOLS, OVERSTONE, NORTHAMPTONSHIRE.—New schools have just been erected at Overstone. Local stone, with Harlestone stone dressings, has been used for walls, with oak timber framing in the gables, &c. The roofs are covered with Broseley tiles. Selected pitch-pine has been used for roof of schools and fittings throughout. The windows have wrought-iron casements and leaded lights, and the buildings throughout are warmed and ventilated by means of Shorland's patent Manchester grates. The work has been carried out by the Estate workmen from plans and under the superintendence of Mr. J. Mander, the Estate architect.

CHURCH, NEWCASTLE.—On the 7th inst., a new church, which has been built at Park-road, Newcastle, was opened. Under the church, and on a level with Cambridge-street, is a school-room, with large platform, and three class-rooms. The church and school were designed by Messrs. Walker & Collinson, and built by Mr. Mauchlen, of Newcastle, under the supervision of Mr. Crossling.

WORKING MEN'S INSTITUTE, ST. JUST, CORNWALL.—A Working Men's Club and Institute has just been erected at St. Just by Mr. Bolitho, M.P. The building occupies a site in Cape Cornwall-street. Along the front and level with the upper floor a balcony runs from end to end. On the upper floor is the club room. There are also retiring and caretaker's rooms on the upper floor. On the ground floor is the reading-room, the library, and the kitchen. Behind the main building and communicating with it is the billiard-room. Messrs. R. H. Roberts and W. Marks, St. Just, were the contractors for the building, which has been built from plans prepared by Mr. O. Caldwell.

BOARD SCHOOL, STARBECK, YORKSHIRE.—Mr. John Barber, chairman of the Bilton School Board, laid the foundation-stone, on the 6th inst., of the first Board School for the district, at Starbeck. The school has been planned in two departments, mixed and infants. Each department will have a central hall, with surrounding class-rooms communicating with it by glazed screens and doors. Each class-room will accommodate sixty children, and the school will give a total accommodation for 600. The Tudor style of architecture has been adopted. The building will be constructed of Pateley stone, with ashlar dressings. The cost of land, buildings, and furnishing will reach about £10,000. Messrs. H. & E. Marten, of Harrogate and Bradford, are the architects.

WESLEYAN CHAPEL, ARTHINGTON, YORKSHIRE.—On the 4th inst. a new Wesleyan Chapel was opened at Arthington. Shipley stone has been used, with ashlar stone dressings, lined with brick. The whole of the work in the interior of the chapel is of polished pitch-pine, and the windows are in stained glass. Accommodation is provided for 150 worshippers. Adjoining the chapel there is a schoolroom, which will hold about sixty scholars, and a vestry; and behind these buildings is a house for a caretaker. The heating is by means of hot-water apparatus. Messrs. Rhodes Brothers, Shipley, were the principal contractors. The total cost will be about 1,400*l.* The architect was Mr. W. H. Beevers, of Leeds.

NEW ALMSHOUSES AT HUNSLET, YORKSHIRE.—It is proposed to erect new almshouses at Hunslet. The necessary land has been secured at Woodhouse Hill, Hunslet, and the plans have been prepared by Mr. John E. Leak, architect, Hunslet, and are now before the Building Clauses Committee of the Leeds Corporation, awaiting their approval. According to Mr. Leak's scheme, each house will contain on the ground floor a living-room, scullery, pantry, coal-place, and outhouse, with a back yard, while on the second floor there will be two bed-rooms.

NEW SCHOOL CHAPEL AT SEDBERGH.—The tender of Messrs. Brassington Bros. & Corney, builders, Settle, has been accepted for these works, including ashlar lining. The amount of the tender was £4,098. Messrs. Paley, Austin, & Paley, Lancaster, are the architects.

SANITARY AND ENGINEERING NEWS.

BUCKINGHAM SEWERAGE.—The Buckingham Town Council, at their meeting held on the 1st inst., resolved to adopt the recommendation of the Committee to carry out a pumping scheme of sewerage for the town, and to instruct Mr. H. Bertram Nichols, C.E., of Birmingham, to prepare the plans, in order to carry out the arrangement entered into by Mr. Higgins, Q.C., on behalf of the Council, so that the scheme might be submitted to the Grand Junction Canal Company by the 17th inst.

SOUTHAMPTON MAIN DRAINAGE.—Mr. F. H. Tulloch, Local Government Inspector, held an inquiry at the Municipal Offices, Southampton, on the 4th inst., concerning the application of the Corporation to borrow the sum of 40,600*l.* for works of main drainage and sewage disposal. The scheme, as prepared by the Borough Engineer, Mr. W. B. G. Bennett, C.E., was fully explained by him. It embraces the main drainage of the eastern districts of the town, comprising 541 acres, with a population of 44,700. The object of the scheme is to prevent the pollution of the River Itchen, and to convey the sewage from its present outlet to disposal works to be constructed near the mouth of the river. Several miles of egg-shaped brick sewers and stoneware tubular pipe-drains are to be laid, also an extensive and separate system of surface drains, supplemented by the existing sewers, which will be retained as outfall sewers for the rainfall only, the house-drainage to be disconnected from the same, and reconnected to the new sewers, which are each to be laid with gradients ensuring self-cleansing velocities. In two low-lying districts the sewage will be lifted by Shone's Pneumatic Ejectors, placed in brick-chambers under the roadway. For the purpose of ventilation it is intended to erect at the heads of each new sewer, approved sewer-gas destructors, in ornamental cast-iron columns. The sewage, on its arrival at the disposal works, will pass through strainers to three direct-acting engines, and pumps of the Worthington type, chemically dosed, and discharged into precipitation tanks, twelve in number, situated at a level to permit of the effluent being run off at all times of the tide. Automatic chemical mixing and feeding machinery to be provided and driven by an independent engine. The precipitated sludge will be drawn from the tanks through a sealed main, lifted by Shone's ejectors into a sludge reservoir, further precipitated and run into iron receivers, from which it will be forced into filter-presses and discharged in cake. Four new cells are to be added to the existing refuse destructor, with two additional boilers inserted for the purpose of supplementing the steam power which it is intended to use for compressing air for operating the Shone's ejectors and the Worthington pumps, also for the filter-presses.

The destructor has for the past eight years supplied the power for working the first installation of the Shone's system laid in connexion with existing sewage disposal works of other districts. The new buildings will consist of an engine and press house, stores, and mixing-room, &c. There was no opposition, and the inquiry terminated, after which the inspector viewed the site of the works. The Corporation recently applied for and obtained an extension of the borough boundaries, comprising the whole of the district of Shirley and Freemantle, and part of Millbrook on the west, and Bitterne Park on the east, thus increasing the population by nearly 20,000, and the area by nearly 2,000 acres.

FORESHORE IMPROVEMENTS AND ELECTRIC LIGHTING AT SOUTHPORT.—Mr. Rienzi Walton held an inquiry on the 3rd inst. at Southport Town Hall, on behalf of the Local Government Board, into two applications for borrowing powers made by the Southport Town Council. The first was in respect to a sum for foreshore improvements. For the construction of a marine drive, and the connexion of the two lakes, the Corporation had been empowered to borrow 20,000*l.* They now proposed to lengthen and raise the bridge over the junction of the lakes, so as to make one continuous slope from the promenade, and this and other work which the alteration involved would cost 8,500*l.*, for which they now applied. The second application related to the electric lighting system, which was put into operation last November. Already more than 2,000 lamps were wired on the mains more than the generating plant could really supply, and the Electric Lighting Committee proposed to extend the buildings and power of the station to meet the present growing demand, and to enable them to tap the residential district of Hesketh Park. The cost of this work was estimated at 21,250*l.*, and over and above the balance in hand they applied for power to borrow 12,000*l.*, in addition to 3,500*l.* for street arc lighting, making 15,500*l.* There was no opposition to either application.

BOWNESS-ON-WINDERMERE SEWERAGE.—Messrs. Lomax & Lomax, Civil Engineers, of Manchester, have received instructions from the Bowness-on-Windermere Urban District Council to prepare a scheme of sewerage and sewerage disposal for the district. At the Appleby Assizes the late Local Board was defeated in an action brought against them for pollution of the lake. After many enquiries the Bowness Council has now practically decided to carry out the "International" system of sewage purification as a remedy for the evils complained of.

FOREIGN AND COLONIAL.

FRANCE.—According to the scheme of M. Bouvard for the 1900 Exhibition, which has been adopted by the Managing Committee, the new Palais des Beaux-Arts, which will replace the Palais de l'Industrie, will consist of a main block bordering the avenue, 100 mètres wide, which will start from the Carré Marigny, and two wings at right-angles to the quay, and flanking the Jardin de Paris. After the Exhibition these two wings will be devoted to the purposes of a museum of contemporary art, a Luxembourg transported to the Champs Elysées. The main block will serve the same purposes as the present Palais de l'Industrie.——At the last sitting of the Académie des Beaux-Arts, the Duc prize was conferred on M. Jossot for his museum at Nantes. ——It is announced that the Berlier scheme for a tubular railway to unite the Bois de Boulogne with the Bois de Vincennes will shortly be submitted to Parliament.——A Society of "Ingénieurs et Architectes Sanitaires" has been started in Paris under the presidency of M. Tollet, for the practical study of sanitary questions. M. Bechman, engineer-in-chief for the Sanitation of the Seine, is the vice-president.——A fine steel bridge has been constructed on the Paris, Lyons, and Mediterranean Railway, on the line from St. Etienne to Montbrison, under the superintendence of M. Clair, engineer to the Company.——The municipality of Avignon have decided on the construction of Halles Centrales to replace the picturesque open-air market which has from time immemorial been held in the square and in the adjoining streets. The project will require an expenditure of three million francs. —— The "Société Nationale des Beaux-Arts" ("Champ de Mars Salon") will be represented at the Berlin Art Exhibition by about one hundred and fifty works in painting, sculpture, and objects of artistic design. ——The death is announced, at the age of forty, of the sculptor Jean Roulleau. He was born at Liborne, and commenced life as a stone-mason; he became subsequently the pupil of M. Cavelier and M. Lafon, and devoted himself entirely to sculpture. He exhibited busts and medals since 1878, and for his first important works, the statue of Lazare Carnot (now erected at Nolay) and the figure of Hebe, he received a second medal in the Salon of 1882. At the exhibition of 1889 he received a silver medal and the Cross of the Legion of Honour. He since produced a colossal statue of Joan of Arc, now erected at Chinon, and which figured in the Salon of 1892, and the monument (which he left nearly completed) of the late President Carnot, intended for the town of Nolay.

PATENT LAW IN PORTUGAL.—We are informed that a new patent law has been published in Portugal which will be more favourable to the development of inventions and industrial enterprise in that country than the existing law. Details are not to hand at present, but it is stated that, among other changes, the fees to be paid by foreign inventors for securing their rights in Portugal have been much reduced.

MISCELLANEOUS.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The members of this society on Saturday last visited the works for the Great Wheel now in course of erection at West Kensington. Of this we have already given a description on the occasion of the visit of another engineering society. The members then visited the site of the forthcoming Indian Exhibition by permission of Mr. Collard, the architect, and were shown the French Hippodrome, a large roof now in course of construction by Messrs. Handyside, and a newly-built mosque for the use of the Mahomedan attendants at the Exhibition.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS. — The nineteenth voluntary pass examination of candidates for municipal surveyorships, carried out by this Association, took place (by kind permission) at the Institution of Civil Engineers, Great George-street, Westminster, on Friday and Saturday, the 5th and 6th inst. There were twenty-five entrances for this examination, and nineteen candidates presented themselves for the test. The examiners were (I.) Engineering as applied to Municipal Work—Mr. A. M. Fowler, M.Inst.C.E. (President); (II.) Building Construction—Mr. W. Geo. Laws, M.Inst.C.E. (Past President); (III.) Sanitary Science—Mr. Chas. Jones, M.Inst.C.E. (Past President); (IV.) Public Health Law, &c.—Mr. J. T. Eayrs, M.Inst.C.E., (Past President), the superintending examiner. The next examination will be held in Manchester on October 4 and 5.

THE PLASTERERS' STRIKE, ABERDEEN.—The beginning of the end of this strike came on the 9th inst. The strike commenced on the 23rd ult. On Tuesday last, of the 140 who went out, only eighteen remained on the strike-roll, the rest having obtained employment in other towns, or with the two outside employers in Aberdeen, who conceded the advance of 1d. per hour. On Monday two members of the Masters' Association also granted the rise. Great dissatisfaction has been felt at houses and shops that should have been finished by Whit Sunday term next month having been left alone, although the proprietors were willing to pay for the increase of wages sought. Other branches of the building trade have also been greatly hindered.

APPOINTMENT OF DISTRICT HIGHWAY SURVEYORS. — On the 8th inst., the West Elloe (Spalding) Rural District Council made the following appointments of surveyors of highways for the several districts of West Elloe, Spalding:—Weston District, Mr. T. Drury, Spalding; Pinchbeck District, Mr. W. T. Smith, Pinchbeck; Gosberton District, Mr. R. Doubleday, Gosberton; and Donington District, Mr. T. Cawdron, Donington.

APPOINTMENT OF SURVEYORS, NEWTON ABBOT.—At Newton Abbot Rural District Council, on the 3rd inst., nine candidates applied for the two posts of road surveyors. For the first Mr. J. L. Davey, Tavistock, was elected, while Mr. Warne was elected for the second. Mr. Davey takes the northern division, with headquarters at Bovey; Mr. Warne the southern, with headquarters at Newton.

MEETINGS.

SATURDAY, APRIL 13.

Edinburgh Architectural Association.—Visit to (1) Heriot Hospital Technical School; (2) The Royal Hospital for Sick Children.

WEDNESDAY, APRIL 17.

Builders' Foremen and Clerks of Works Institution.—Quarterly Meeting of the Members. 8 p.m.

Carlisle Architectural, Engineering, and Surveying Association.—8 p.m.

British Archæological Association.—The Rev. Henry Cart, M.A., on "A Recent Visit to Carthage." 8 p.m.

THURSDAY, APRIL 18.

Society for the Encouragement of the Fine Arts.—Second Conversazione, at the Galleries of the Royal Institute of Painters in Water-Colours, Piccadilly.

FRIDAY, APRIL 19.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Mr. W. C. Tyndall on "House Drainage." 8 p.m.

SATURDAY, APRIL 20.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Inspection and Demonstration of the Barking Sewage Outfall Works.

Glasgow Architectural Association.—Visit to Stirling.

Queen's College, Cork. — Mr. Arthur Hill on "The History of Architecture." XIX. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

4,511.—WINDOWS: *A. Wynn.*—According to this invention the window-frame is constructed so as to provide a means of ventilation. The top of the frame and the sides are formed hollow, the lower hollow part of the frame communicating through a short passage with the outer air, whilst the top part of the frame communicates by means of a long slit with the interior of the room. A curved hinged bar is used for opening or closing the slit.

6,510.—WINDOWS: *B. Wills.*—This patent relates to methods of raising, lowering, and balancing windows, and is effected by means of jointed rods arranged after the manner of a pantagraph. Two of the adjacent sides of this parallelogram are extended to a convenient distance and act as a kind of lever, the fulcrum of which is the angle of the pantagraph, projecting between them and attached to a fixed pin. By means of flat weights attached to an arm of each pantagraph, the window may easily be raised or lowered.

6,890.—PAVING: *G. Cory and another.*—The object of this invention is to provide a non-slipping material for road and street paving, consisting of a composition of asphalte or cement, together with a quantity of waste fibrous materials, such as wood shavings, chips, bark, or fibrous materials.

7,629.—PAINTING: *J. Redman.*—This invention relates to methods of applying paint by means of a hose attached to a cylindrical-shaped vessel provided with an air-pump, by which air can be forced into its interior. The air suction is connected to a coil of pipe below the bottom of the vessel, so that when the vessel is placed over a fire the paint may be applied hot.

8,853.—SASH-FASTENER: *W. Nicol.*—To prevent sliding windows being opened from the outside, a crank-shaped swivelling arm, having a deep flange projecting at right-angles at its loose end, is mounted by a pin on the face of the lower sash-frame. A double-kneed plate is screwed into a recess in the batten-rod opposite the arm, and acting in conjunction with it, prevents either sash being opened.

9,045.—WATER-CLOSETS: *H. Dakin.*—Refers to the joint between the closet and the outlet pipe. The closet-trap outlet is provided with an annular groove, into which a spigot-end on the outlet bend is inserted. This is fixed by pouring in cement.

20,996.—TILES: *T. Jarrett.*—To securely fix tiles to floors, walls, &c., undercut surfaces are formed in them by placing in the moulds a flexible air-containing apparatus which, by pressing, produces the surfaces required.

1,247.—LADDERS: *A. Bartlett.*—A device to be attached to ladders for holding articles, &c. A plate or tray is fixed to rods having hooks to catch on the rung of the ladder. Other hooks fixed to collars slide on the rods and act as stays.

NEW APPLICATIONS FOR LETTERS PATENT.

MARCH 25.—6,109, S. and M. Adams, Flushing Syphons.—6,119, W. Given, Joint for Pipes.—6,131, W. Mappin, Spindles and Knobs for Door and other Handles.—6,134, W. Sykes, Yard Gullies.—6,136, W. Sykes, Street Gullies.—6,174, J. Edwards and the Coalbrookdale Company, Limited, Devices for supporting, adjusting, and holding in position Eave Troughs, Scaffolds, and other similar articles.—6,179, H. Mossner, Construction of Floors and Ceilings.

MARCH 26.—6,227, F. Brooke, Slow Combustion Fireplaces.—6,229, W. Stanley, Surveyors' Levels.—6,237, E. Böhm, Enamelled or Glazed Bricks and Tiles.—6,239, R. Hughes and J. Gill, Machinery for Pressing Bricks, &c.—6,240, G. and J. Rushworth, Securing Saw Blades in Stone-sawing Machinery.—6,255, J. Leeming, Pipes or Channels for Drains and Sewers, and in the jointing of same.

MARCH 27.—6.309, J. Glaister, Draught-Excluder for Doors.—6,339, R. Pollard and R. Gibbs, Grindstones.—6,341, M. Rutley, jun., Kegs, Cans, or Receptacles for storing Paint, &c.—6,343, S. Whitehead, Sash-Fastener.

MARCH 28.—6,416, F. Ball and J. Winter, Ceiling Roses for Electric Light Fittings.

MARCH 29.—6,437, W. Scott-Moncrieff and H. Farmer, Flushing Apparatus.—6,461, J. Graep, Protective Lattice for Windows.—6,463, K. Krebs, Stoves.—6,488, P. McKenzie, Frames and Casings for Window Sashes and Blinds.—6,492, W. Tickle, Saws.—6,501, M. Schroeder, Water Pipes.

MARCH 30.—6,539, J. Green, Weather Bars or Draught Excluders for Doors, &c.—6,590, E. Glaskin, Gate and other Locks.—6,614, R. Adams, Opening, Closing, Regulating, and Fastening at any desired angle Swing and other Windows, Ventilators, Doors, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,067, W. Fox, Disinfectant Ventilator, Dirt and Dust, Soot and Smuts Excluder, to be attached to Window-sashes and Frames.—4,306, W. Ederington, Prevention of Bursting of Kitchen Boilers.—4,772, J. Hamilton, Water-closets.—4,825, G. Hazlehurst, Thawing Frozen Water-pipes.—4,855, E. Jones, Kilns.—4,931, J. Bruce, Self-closing Gates and Doors.—5,465, W. Marshall, Window-casements and Frames.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

6,168, W. Horne, Fireproof Buildings, and rendering Existing Buildings Fireproof.—9,352, H. Chubb, Waste Preventing and Flushing Cisterns for Water-closets, &c.—9,415, F. Lynde, Clearing Drains, and other Pipes.—24,855, M. Adams, Flushing Apparatus, &c.—4,009, J. Wilson, Smoke Cures and Ventilators.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

APRIL 2.—By *J. D. Wood & Co.*: No. 38, Gray's Inn-rd., f., 2,800*l.*—By *W. Hall*: F.g.r. of 28*l.* 10s., Hither Green Lane, Lewisham, reversion in 71 yrs., 645*l.*; f.g.r. of 8*l.*, Usher-rd., Bow, reversion in 73 yrs., 190*l.*; f.g.r. of 12*l.*, Stanley-rd., Harringay, reversion in 86 yrs., 290*l.*; f.g.r. of 20*l.*, Mayo-rd., Willesden, reversion in 88 yrs., 470*l.*; i.g.r. of 27*l.*, Porteus-rd., Paddington, u.t. 43 yrs., g.r. 7*l.* 10s., 345*l.*

APRIL 3.—By *Furber, Price, & Furber*: 77, Hackney-rd., Hackney, f., r. 63*l.*, 1,000*l.*; 79, Hackney-rd., f., r. 40*l.*, 1,000*l.*; 81, Hackney-rd., f., r. 50*l.*, 1,520*l.*; f.g.r. of 10*l.*, Axe-pl., reversion in 30 yrs., 235*l.*; 1 and 2, Axe-pl., f., 400*l.*; 3 to 13, Axe-pl., f., 1,025*l.*—By *Rushworth & Stevens*: I.g.r. of 78*l.* 15s., Kenton-st., Brunswick-sq., u.t. 11½ yrs., g.r. 30*l.*, 250*l.*; "Culloden House," London-st., Kingston-on-Thames, f., r. 20*l.*, 410*l.*; "Vernon House," London-st., f., r. 20*l.*, 450*l.*—By *Baxter, Payne, & Lepper*: "The Royal Oak," Public House, Oxted, Surrey, with outbuildings and two cottages, 1,800*l.*; House, stabling, stores, and 3 a. Fawkham, Kent, f. 1,400*l.*

APRIL 4.—By *Newbon & Co.*: 6, Montem-st., Holloway, u.t. 75 yrs., g.r. 6*l.*, 235*l.*; 20, Palmerston-rd., Finsbury-pk., u.t. 70 yrs., g.r. 7*l.*, 215*l.*; 22, 23, and 24, Queen Anne-rd., Hackney, u.t. 50 yrs., g.r. 15*l.*, 745*l.*; 226, Richmond-rd., Dalston, u.t. 50 yrs., g.r. 12*l.*, 435*l.*; 46, Spencer-st., Clerkenwell, u.t. 15½ yrs., g.r. 24*l.*, r. 45*l.*, 90*l.*; 153, Highbury New-pk.,

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewerage Works	Thornhill(Yorks)U.D.C	J. C. Haller	April 16
Ragstone Metal	Rochester Sewers Com.	.....	April 17
Additions, &c. to County Buildings, Chester	Cheshire C.C.	S. Bull	April 18
Mountsorrel, &c. Granite	Thrapston D.C.	G. Siddons	do.
*Painting Works	M. R. Co.	*Official*	do.
*Making-up Roads, &c.	Finchley U.D.C.	F. Smythe	April 19
*Main Drainage Works	Caversham U.D.C.	N. Lalley	do.
Mancetter, &c. Granite Road Metal	Daventry R.D.C.	*Official*	do.
Repairs, &c. to Church, Shepton, Montague, Castle Cary	Rev. J. A. Alexander	E. Buckle	April 20
Two Houses, Flass-road, Esh Colliery, Newcastle-on-Tyne	W. Pearson	.....	do.
Slag and Granite Road Metal	Oundle R.D.C.	N. E. Dixon	do.
Road Maintenance, Dingwall, N.B.	Ross & Cromarty C.C.	A. G. Jcass	April 22
Brick Sewers under the Rivers Mersey and Goyt	Stockport Corp.	A. M. Fowler	do.
*Painting, &c. at Infirmary	St. Marylebone Guar.	*Official*	do.
*Service Reservoir	Kettering Waterworks Co.	T. Hennell	do.
*Road Works	Hendon U.D.C.	S. S. Grimley	do.
*Painting, &c. at Infirmary	Croydon Union	F. West	do.
*Superstructure of Extension of Asylum	Newcastle-upon-Tyne Lunatic Asylum	J. W. Dyson	April 23
Schools and Residence	Steeple Claydon(Bucks) Sch. Bd.	Bennett & Sons	do.
Granite Road Metal (300 tons)	Carshalton U.D.C	R. A. Wilson	do.
*Repairing Roads, Supply of Granite, &c.	Borough of Croydon	W. Powell	do.
New Railway, Heaton Lodge and Wortley, Leeds	L. & N. W. Ry.	*Official*	April 24
*Fire Mains and Hydrants	St. George's Union	H. Saxon Snell	do.
Road Bridge and Approaches, Latchford, Cheshire	Manchester Ship Canal Co.	*Official*	April 25
*Extension of Electricity Generating Station	Brighton Town Coun.	F. J. C. May	do.
*Broken Granite	Walthamstow U.D.C.	G. W. Holmes	April 26
*Painting Roof on North Side	Trustees of Borough Market	H. Jarvis & Son	do.
*Post Office, Tunbridge Wells	Com. of H. M. Works	*Official*	do.
*Schools and Offices	Edgware School Board	do.	do.
*Additional Buildings at Asylums	Hull Corp.	do.	do.
*Rebuilding West Block at Workhouse	Westminster Union	J. Waldram & Son	May 10

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Heating the Public Library	West Hartlepool Corp.	J. W. Brown	April 26
*House, New Maldon	.....	Mr. Davison	April 27
*Underground Conveniences	Com. of Sewers (City of London)	*Official*	April 30
*Additions at Workhouse	Mansfield Union	R. F. Vallance	May 1
*Gas Engineering and Fittings	West Ham School Bd.	Newman & Jaques	May 7
*Waterworks	Kendal Corporation	G. F. Deacon	do.
*Sewage Works	Wellingboro' U.D.C.	G. & F. W. Hodson	do.
*Sanitary Fittings in Town Hall	Manchester Corp.	T. de Courcy Meade	May 8
Sanitary Fittings in Conveniences, Philip's Park and Queen's Park	do.	do.	do.
*Construction of Roads	St. Nicholas Estate, Harpenden		Stafford & Rogers	No date
*Isolation Hospital, &c.	Malling R.D.C.	J. Ladds	do.
Two Cottages, Scales, Aspatria, Cumberland	J. B. Ashbridge	.....	do.
Two Houses, Swalwell, Durham	T. H. Stafford	.....	do.
Four Houses, Wallsend, Durham	G. M. Harroway	.....	do.
Building Bridge Hotel, Chester-le-Street	Newcastle Breweries, Ltd.	Jos. Oswald	do.
Two Annexes at Asylum, Clifton, York	Committee	G. H. Fowler Jones	do.
*Alterations to Town Hall, N.W. Dist.	.....	.....	do.
Schools, Pontefract-lane, Leeds	.....	J. M. Bottomley	do.
Schools, Standish Lower Ground, Wigan, Lancs.	.....	Heaton & Ralph	do.
Shops and other Business Premises, Mesnes-street, Wigan	.....	do.	do.
Granite, &c. Chippings, Stirling, N.B.	.....	E. Simpson	do.
Rebuilding Shed, &c. Stanningley, Leeds	.....	J. E. Leak	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Surveyor, &c.	Northampton R.D.C.	110*l.*	April 16
*Clerk of Works	York School Board	3*l.* 10s.	April 17

Those marked with an asterisk (*) are advertised in this Number. *Contracts, pp.* iv., vi., vii., viii., *and* xvii. *Public Appointments, p.* xvi.

Highbury, u.t. 54 yrs., g.r. 15*l.*, r. 140*l.*, 1,650*l.*; 16 and 18, Percy-rd., Shepherd's Bush, f., 720*l.*—By *Stimson & Sons:* 214, Bridge-rd., Battersea, u.t. 63 yrs., g.r. 5*l.* 10s., 300*l.*; 22, 24, and 26, Costa-st., Peckham, u.t. 67 yrs., g.r. 12*l.*, 510*l.*; 6 and 7, Camden-grove, Chislehurst, f., 510*l.*; 20, Park Hill, Clapham Pk., u.t. 48 yrs., g.r. 15*l.*, 750*l.*; f.g.r. of 12*l.*, Manor-rd., Thames Ditton, reversion in 69 yrs., 280*l.*; 11, Station-rd., Anerley, f., r. 35*l.*; 370*l.*; 76 and 78, Ballater-rd, Brixton, u.t. 85 yrs., g.r. 14*l.* 14s., r. 60*l.*, 500*l.*; 84 and 86, Ballater-rd., u.t. 85 yrs., g.r. 14*l.* 14s., r. 60*l.*, 500*l.*; 105 and 105A, Hither Green-lane, Lewisham, f., 350*l.*; 1 and 3, Beckenham-rd., Penge, f., r. 56*l.*, 550*l.*; 5, Beckenham-rd., f., r. 40*l.*, 450*l.*; two plots of land, Duncombe Hill, Forest Hill, f., 150*l.*; 1, 3, 5, and 7, Station-rd., Norwood, u.t. 70 yrs., g.r. 34*l.*, 1,730*l.*—By *Towers, Ellis, & Co.:* 48, Queen's-rd., Bayswater, u.t. 31 yrs., g.r. 6*l.* 6s., r. 100*l.*, 700*l.*; 52 and 54, Queen's-rd., u.t. 52 yrs., g.r. 16*l.*, r. 160*l.*, 1,245*l.*

APRIL 5.—By *G. Billings:* 1 to 4, College-st., Homerton, u.t. 71 yrs., g.r. 16*l.*, 410*l.*; 38 and 40, College-st., f., r. 45*l.* 12s., 415*l.*; 42 to 52 (even), Nisbet-st., u.t. 75 yrs., g.r. 30*l.*, 490*l.*—By *Ernest Owers:* 77, Leipsic-rd., Camberwell, u.t. 12 yrs., g.r. 3*l.*, r. 33*l.* 16s., 90*l.*; 1, Gascony-av., West Hampstead, f., r. 40*l.*, 520*l.*; 9, Frognal, Hampstead, f., sold privately.

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.r. for unexpired term; p.a, for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	10/0/0 16/0/0
Sequoia, U.S. ft. cu		1/10 2/2
Ash, Canada load		2/15/0 4/0/0
Birch, do.		2/15/0 4/0/0
Elm, do.		3/10/0 4/15/0
Fir, Dantsic, &c.		1/15/0 3/10/0
Oak, do.		2/15/0 4/15/0
Canada		5/10/0 7/0/0
Pine, Canada red		2/15/0 3/5/0
Do. Yellow		3/5/0 5/10/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		3/0/0 5/5/0
Odessa, crown		3/0/0 5/5/0
Deals, Finland 2nd & 1st std 100		7/0/0 8/10/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/0/0
St. Petersburg, 1st yellow		9/10/0 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 9/10/0
Swedish		7/0/0 25/10/0
White Sea		7/10/0 15/0/0
Canada, Pine 1st		21/0/0 24/10/0
Do. do. 2nd		16/10/0 17/10/0
Do. do. 3rd, &c.		8/0/0 10/5/0
Do. Spruce, 1st		8/10/0 10/0/0
Do. do. 3rd and 2nd		6/10/0 7/5/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 21/0/0
Flooring boards, sq., 1 in. prep.		0/9/0 0/14/0
Do. 2nd		0/6/6 0/11/0
Other qualities—		0/4/6 0/7/0
Cedar, Cuba	ft.	/3 /4
Honduras, &c.		/3 /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3½ 1/0
Mexican do. do.		/3 /4
Tobasco do. do.		/3½ /6
Honduras do.		/3½ /5½
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER *(continued).*		
Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian	0/0/3½	0/0/7

METALS.		
Iron—Pig, in Scotland	ton	2/2/0 0/0/0
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		42/10/0 43/0/0
Best selected		43/0/0 43/10/0
Sheets, strong		50/0/0 0/0/0
Chili bars		39/16/3 40/1/3
YELLOW M'TALB		0/0/41-16 0/0/41½
LEAD—Pig, Spanish	ton	10/0/0 0/0/0
English com. brands		10/2/6 10/3/9
Sheet, English, 6 lbs. per sq. ft. and upwards		10/15/0 11/0/0
Pipe		11/15/0 0/0/0
ZINC—English sheet	ton	18/10/0 19/0/0
Vieille Montagne		19/10/0 0/0/0
TIN—Straits		64/5/0 64/15/0
Australian		64/15/0 65/5/0
English Ingots		67/10/0 68/0/0
Banca		64/5/0 64/10/0
Billiton		63 5/0 63/10/0

OILS.		
Linseed	ton	19/10/0 19/17/6
Cocoanut, Cochin		25/10/0 0/0/0
Do. Ceylon		23/5/0 0/0/0
Palm, Lagos		23/10/0 0/0/0
Rapeseed, English pale		22/10/0 0/0/0
Do. brown		21/0/0 0/0/0
Cottonseed ref.		17/15/0 18/15/0
Oleine		19/10/0 21/1/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 12/0/0
TAR—Stockholm	barrel	1/1/0 1/1/6
Archangel		0/15/6 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ABERDEEN.—Accepted for the erection of a shop, New Deer, for Messrs. James Mackie & Co., Ltd. Mr. Jas. Duncan, architect, Turriff:—

Masonry.—Milne & Crichton, New Deer	£379 10
Carpentry.—A. Murison, New Deer	210 0
Slating.—James P. Pirie, Fyvie	30 0
Plastering.—Alex. Craig, New Pitsligo	12 10
Plumbing.—Chas. Duthie, Turriff	14 10
Painting.—J. D. Watson, Turriff	7 10
	£560

BATH.—For the erection of school buildings, Bathampton, for the Bathampton School Board Mr. W. J. Willcox, architect, 1, Belmont, Bath. Quantities by architect:—

W. Webb	£2,190	C. Wibley	£1,878
B. Smith	2,105	Long & Sons	1,840
H. Bladwell	2,094	Hayward & Wooster, Bath (accepted)	1,797
H. Wilkins	1,924	E. Chancellor	1,675
Howard & Sons	1,887		

BERKSHIRE COUNTY COUNCIL.—For the Berkshire County Bridges:—

Contract No. 1.—Brick Bridge at Aldermaston.

Tucker	£262	James	£164
Allen	215 12 6	Johnson, Woolhampton*	151 15
Carter	197 3 6		

[Surveyor's estimate, £226 9 0.]

Contract No. 2.—Abel Bridge, Brimpton.—Steelwork.

Tucker	£435	Rubery & Co.	£303 19 7
Allen	433	Lysaght	299 17 9
Elms	376	Ellis	295 17 6
The Horsehay Co.	369 14 8	Finch & Co.	291 8 9
Newton, Chambers, & Co	369 10	Tildesley & Co.	288 0
Caffin	365 10	Dyne, Steel & Son	283 0
Cochrane & Co.	353	Brettell	277 6
Pitts	352 4 8	Cleveland Bridge Co.	271 6
Shewell & Co.	332 17 2	Barry & Higham	270 0
Pierson & Co	323 17 10	Woodall, Dudley*	262 9
The Engineering Supply Co.	306 3 9	*Too late.*	
		J. J. Robins	295 10 7
		Hill & Smith	291 14 7

[Surveyor's estimate, £369 8s. 4d.]

Contract No. 3.—Abel Bridge, Brimpton.—Foundations.

Tucker	£545	Allen	£469
Caffin	492 11 11	Johnson	465
Elms	479	T. James, Midgham*	432

[Surveyor's estimate, £504 12 1c.]

Contract No. 4.—Bagshot Bridge.—Steelwork.

Allen	£156	Pitts	£118 11 5
Tucker	140	Dyne, Steel & Son	114 14 6
Cochrane & Co.	139	Woodall	108 11 3
Rubery & Co.	137 8 11	Lysaght, Limited	108 2 3
Elms	132	Cottrell & Co.	105 2 9
Newton, Chambers, & Co	131 10	Ellis	101 12 0
The Horsehay Co.	130 14 5	Barry & Higham	98 10 0
Engineering Supply Co.	129 15 8	Brettell	95 0 0
Finch & Co.	126 1 7	Cleveland Bridge & Engineering Co, Darlington*	84 8 0
Tildesley & Co.	122 0 0	*Too late.*	
Shewell & Co.	120 2 5	Hill & Smith	103 2 8
Peirson & Co.	118 14 5	J. J. Robins	102 5 4

[Surveyor's estimate, £101 1 6.]

Contract No 5.—Bagshot Bridge Foundations.

Tucker	350	Woolridge & Son	204 7 0
Hoskings	253	Allen	195 0 0
Elms	219		

[Surveyor's estimate, £223 1 9.]

Contract No. 6.—Buckland Bridge.—Steelwork.

Allen	£180	Ellis	122 3 0
Horsehay Co.	152 10 9	Woodall	121 4 0
Newton, Chambers & Co.	150 10 0	Cottrell & Co.	119 9 9
Cochrane & Co.	141 0 0	Lysaght, Ltd.	114 13 10
Tucker	140 0 0	Peirson & Co.	113 18 6
Rubery & Co.	138 19 5	Barry & Higham	110 0 0
Tildesley	135 0 0	Brettell	106 0 0
Finch & Co.	131 11 0	Cleveland Bridge Co, Ltd.	94 0 0
Shewell & Co.	131 9 2	*Too late.*	
Pitts	130 18 6	J. J. Robins	118 17 8
Dyne, Steel, & Son	122 15 0	Hill & Smith	104 2 3

[Surveyor's estimate, £114 18s. 8d.]

Contract No. 7.—Buckland Bridge Foundations.

Tucker	£420	Allen, Reading*	£233
Wheeler	275	* Accepted.	

[Surveyor's estimate, £193 1s. 2d.]

ACCRINGTON.—Accepted for the erection of a post-office, Church-street, Accrington, for Mr. Edmund Riley, Accrington. Messrs. Haywood & Harrison, architects, Accrington. Quantities by the architects:—

Masonry.—Thomas Cronshaw	£1,395 3 6
Joinery.—Richard Nuttall	808 14 0
Slating.—Evans & Co.	97 5 0
Plumbing.—Carter & Sons	424 0 0
Painting.—Arthur Wilson	62 18 9
Plastering.—John W. Douthwaite	70 9 0
Smithing and Ironfounding.—Architect's estimate	135 0 0
	£2,983 10 3

[All of Accrington.]

BIRMINGHAM.—For making, &c., seven new roads, Grange Estate (two miles), King's Heath, for the Birmingham Freehold Land Society. Mr. Thos. S. Fallows, Surveyor, 59, Temple-row, Birmingham.

Hall	£10,300	McKay	£8,805 13 3
Jacob Biggs	9,250	Jones & Fitzmaurice	8,774 0 0
Geo. Law	9,001	Currall & Lewis, Birmingham*	8,646 6 7
John White	8,975 18 9		

* Accepted.

BRADFORD.—Accepted for alterations, &c., at the Technical College. Mr. T. C. Hope, architect, 27, Kirkgate, Bradford:—

Masonry, Ironwork, and Concreting.—Walter Barraud *Joinery, Glazing, and Painting.*—N. & D. Thompson *Plastering.*—Charles Howroyd & Sons	£542

[All of Bradford]

BROTHERTON (Yorks.).—For the erection of school buildings and master's house, for the School Board. Mr. John Holmes Greaves, architect, Leeds and Pontefract. Quantities by the architect:—

Excavating, Bricklaying, and Masonry—Geo. Spurr, Pontefract	£1,220 0 0
Carpentry and Joinery.—Barker & Jowett, Pontefract	674 12 0
Plumbing.—Jas. Powell, S. Milford	150 0 0
Painting.—"	45 0 0
Slating.—Geo Garbutt, Normanton	161 5 2
Plastering.—F. H. Marsden, Knottingley	125 0 0
Total	£2,355 17 2

[Architect's estimate, £2,350.]

BUILTH (Wales).—Accepted for the erection of an iron bridge over the River Whefry, for the County Council (Breconshire). Mr. Wm. Williams, County Surveyor, Shire Hall, Brecon:—

Finch & Co., Bridge Works, Chepstow	£160

BURTON-ON-TRENT. — For alterations to the chancel of Rangemore Church, Burton-on-Trent, for the Right Hon. Lord Burton. Messrs. G. F. Bodley, R.A., & T. Garner, architects. Quantities by Messrs. Northcroft, Son, & Neighbour:—

G. F. Smith & Sons	£2,670	H. R. Franklin	£2,226
Stephens, Bastow, & Co., Ltd.	2,399	Rudd & Son (accepted)	2,135

CARDIFF.—Accepted for forming, metalling, paving, kerbing, &c., Donald-street, and several others, for the Corporation. Mr. W. Harpur, C.E., Borough Engineer, Town Hall, Cardiff. Quantities by Borough Engineer:—

James Rich, of Cardiff.

Diana-street	£832 5 3	Essich-street	£141 12 8
Alfred-street	897 1 6	Dalcross-street	312 18 7
Donald-street	743 18 3	Diana-lane	31 15 6
Argus-street	363 13 10	Nincan-lane	150 13 2
Montgomery-street	284 14 8	Percy-street	323 14 3
Lochaber-street	433 19 0	Trade-lane	134 13 6
Tulloch-street	130 7 4		

CHEAM.—For alterations, &c., at the "Lord Nelson" Inn, Cheam, for the London & Burton Brewery Co. Messrs. Saunders & Tuich, architects. No quantities:—

	I.	II.	III.	IV.	Total.
	£	£	£	£	£
R. J. Humphries	155	150	50	120	475
Stimpson & Co.	160	132	40	120	452
Soole & Son	158	128	42	106	434
Balchin & Topland	162	114	14	37	267

[I.—New shop front; II.—New tap-room, &c.; III.—Blacksmith's shop repairs; IV.—Fittings.]

CRAMLINGTON (Northumberland).—For the erection of a bakery, &c., for the Co-operative Society. Mr. J. G. Crone, architect, 5, Grainger-street, Newcastle-on-Tyne:—

Parrett & Co.	£785	C. Pattinson	£734
A. Gray, jun.	743	Dixon & Simmons, Cramlington (accepted)	607
D. Spence	743		

[Exclusive of ovens and machinery, which will be supplied by Mason & Co., Limited, Manchester.]

DARTFORD.—For the execution of street-improvement works Orchard-street, for the Urban District Council. Mr. W. Hanson, C.E., High-street, Dartford:—

Patent Victoria Stone Co.	£157	10	0	PatentInduratedStone Co.	119 0 0
Imperial Stone Co.	136	4	0	A. J. Phillips & Co., 6, Guildhall Chambers (accepted)	114 7 6
J. Mowlem & Co.	131	4	3	Wilkinson & Co., Ltd. (paving only)	84 0 0
Stuart's Granolithic Paving Co.	128	12	4		
Jones's Annealed Concrete Co.	120	0	0		

DERBY.—For the execution of sewerage works, Tibshelf, for the Blackwell Rural District Council. Mr. Herbert Walker, C.E., Newcastle Chambers, Nottingham. Quantities by Engineer.

T. Smart	£2,220	0	0	J. F. Price	£1,950 0 0
I. Tomlinson	2,185	0	0	Herbert Weldon	1,910 4 0
H. Vicars	2,174	0	0	James Holmes, Clay Cross, Chesterfield*	1,909 15 5
J. H. Vicars	2,085	0	0		
J. Lane	2,020	0	0		

* Accepted.

EDGWARE (Middlesex).—Accepted for repairs to the "Bald-faced Stag," for Messrs. A. & C. Marshall. Mr. George Hornblower, architect, 20, Fitzroy-street, W.:—
J. Allen & Sons £153 10

GODSTONE.—For the execution of sewerage works (Contract A), Bletchingley, for the Rural District Council. Messrs. Fairbank & Son, engineers, 17a, Lendal, York. Quantities by engineers:—

Thos. Adams	£1,708	10	9	J. R. Hunt	£1,351 0 0
John Jackson	1,592	12	9	Geo. Osenton	1,229 18 2
R. R. Facey	1,472	3	2	Wm. Cunliffe	1,103 0 0
P. Peters	1,438	4	8	Thomas Bell, Market Weighton*	1,040 7 4
E. Steer	1,401	17	0		

* Accepted.

GOSFORTH (Northumberland).—For excavating, channelling, &c., the Coxlodge-roadway, for the Urban District Council. Mr. C. J. Baff, Surveyor, Council Chambers, Gosforth:—

Robson	£547	3	1	Harbottle	£465 3 9
Armstrong	496	13	9	Moore	447 8 1
Simpson, Ellison-terrace, Newcastle*	483	3	1	Henderson	362 10 9

* Accepted.

[Surveyor's estimate, £504 os. 7d.]

HALIFAX.—Accepted for addition to warehouse at Miall St. Mills, for Messrs Hollingrake & Clegg, Limited. Mr. Arthur G. Dalzell, architect and surveyor, Albany Chambers, 15, Commercial-street, Halifax:—

Masonry.—Hy. Jenkinson	£121 10 0
Joinery.—Joseph Halliday	85 0 0
Slating.—Rushworth & Firth	33 10 0
Plumbing.—George Priestley	21 6 0
Ironfounding.—John Berry	18 15 6
	£280 1 6

HARROGATE.—Accepted for the erection of four villa-residences, York-place, for Rev. R. C. Wilford. M.A. Mr. W. H. Beevers, architect, 25, Bond-street, Leeds. Quantities by the architect:—

Masonry, Bricklaying, Joinery, and Slating.—Rhodes Bros, Shipley, Yorks	£3,861
Plumbing and Glazing.—G. Thompson, Park-lane, Leeds	385
Plastering and Concreting.—J. W. Moody, Shipley, Yorks	477
Bellhanging.—P. Bartle, Harrogate	20

HASTINGS.—For the execution of sewerage works in Grove-road, and several others, at Clive Vale, for the Corporation. Mr. P. H. Palmer, C.E., Town-hall, Hastings:—

Wilkinson Bros.	£7,900	0	0	W. H. Saunders	£6,490 0 0
Jenkins & Sons	7,839	0	0	J. & P. Phillips	6,090 0 0
H. Hill	7,669	10	11	H. Roberts	6,000 0 0
Peter Jenkins	7,578	0	0	G. Bell	5,890 0 0
T. Adams	7,557	0	0	A. King, St. Leonards*	5,502 0 0
G. Osenton	7,221	0	0		
A. Kellett	7,100	0	0		

* Accepted.

HASTINGS.—For the construction of a brick main sewer, Rock-a-Nore to The Bourne, for the Corporation. Mr. P. H. Palmer, C.E., Town Hall, Hastings:—

H. Roberts	£3,825	0	0	A. Kellett	£2,861 0 0
Geo. Osenton	3,779	0	0	Wilkinson Bros.	2,820 0 0
Thomas Adams	3,458	0	0	Peter Jenkins	2,790 0 0
H. Hill	3,362	13	6	G. Bell, London*	2,780 0 0

* Accepted.

HENDON (Middlesex).—Accepted for verandah, bay-window, &c., St. Swithin's, for Mr. W. R. Bousfield, Q.C., M.P. Mr. George Hornblower, architect, 23, Fitzroy-street, W.:—
William Tout £339

HENDON (Middlesex).—Accepted for repairs and alterations to No. 6, Brent-villas (Cather Estate). Mr. George Hornblower, architect, 20, Fitzroy-street, W.:—
William Tout £203 17 3

HUCKNALL TORKARD (Notts.).—For the execution of sewerage and street works, for the Urban District Council. Mr. Wm. Swann, Surveyor, Council Offices, Hucknall Torkard. Quantities by Surveyor:—

Jas. Bradley	£1,000	12	0	J. & R. Stainforth, Hucknall Torkard*	£740 0 0
Jno. Holme	830	14	0		
Jos. Tomlinson	739	0	0		

* Accepted.

HUDDERSFIELD.—Accepted for enlarging St. Andrew's Vicarage. Mr. W. Watson, architect, Wakefield:—
All the Work.—Mark Brook £349 10

ILKESTON.—For telescoping a 52-ft. gasholder, and supplying a new one. Mr. F. C. Humphrys, engineer, Gasworks, Ilkeston:—
Clayton, Son, & Co., Leeds £1,024
[15 other tenders.]

LEEDS.—Accepted for the erection of three shops and houses, Meadow-lane, for Mr. John Bowling, Official Receiver, Park-row, Leeds. Mr. Windsor Thorp, architect, 22A, Commercial-street, Leeds. Quantities by architect:—

Masonry and Bricklaying.—Burn & Hardy, Sun-street, Leeds	£521 15 0
Carpentry and Joinery.—J. Allinson, Concord-street, Leeds	285 10 0
Slating.—Watson & Worsnop, Whitehall-road, Leeds	41 5 0
Plumbing and Glazing.—Alfred Stephens, 19, East-street, Leeds	119 3 0
Plastering.—Mann & Tomkinson, Folly-lane, Beeston Hill, Leeds	84 0 0
Painting.—Tollerton & Co., Merrion-street, Leeds	22 6 4
Total	£1,073 19 4

LONDON.—For the construction of road and sewer between Haverstock-hill and England's-lane, for the Vestry of St. John, Hampstead. Mr. Charles H. Lowe, Surveyor, Vestry Hall, Hampstead, N.W.:—

Wm Griffiths	£3,000			E. Rogers & Co.	£2,197
W. H. Watts, jun.	2,449			R. Ballard, Ltd.	2,190
Nowell & Robson	2,350			Wilkinson Bros.	1,850
Wm. Walker	2,295			Thos Adams, Green Lanes, Wood Green*	1,797
C. W. Killingback & Co.	2,210				
S. Kavanagh	2,200				

* Accepted.

LONDON.—For kerbing and paving part of West-hill, Sydenham, for the Lewisham Board of Works:—
John Mowlem & Co. £180

LONDON.—For the erection of underground store, and "dwellings" over, Backchurch-lane, Whitechapel, for Mr. B. Corcoran. Mr. Walter L. Paul, architect, 28, Furlong-road, Holloway:—

Johnson	£2,630	Winderbank*	£2,272
Newton	2,445		

* Accepted.

[Architect's estimate, £2,269.]

LONDON.—Accepted for alterations and sanitary works at 43, Buckland-crescent, for Mr. J. Buttery. Mr. W. Wallace, architect, 27A, Old Bond-street:—
W. Sumner & Co., West Hampstead £234

LONDON.—Accepted for alterations and shop fittings at 231, Finchley-road, for Mr. A. Livingston:—
W. Sumner & Co., West Hampstead £317

LONDON.—For making-up six new roads within the district of the Hornsey Urban District Council:—

	I.	II.	III.	IV.	V.	VI.
	£	£	£	£	£	£
T. G. Dunmore	283	1,235	1,199	878	887	1,676
G. Bell	226	871	831	604	630	1,228
T. Adams, Wood Green*	189	773	745	594	589	1,122
J. Bloomfield	201	852	816	639	691	1,200
W. Griffiths	211	966	854	676	681	1,276

* Accepted for the six roads.

[I.—Waldegrave-road (3rd section); II.—Burghley-road (3rd section); III.—Coleraine-road; IV.—Courcy-road; V.—Barrington-road (2nd section); VI.—Rathcoole-avenue.]

LONDON.—For the completion of fourteen houses, Brixton, for Messrs. A. & J. Wise. Mr. Henry J. Wise, architect, 38, Basinghall-street, E.C.:—

W. Smith & Sons	£950	0	0	John Glass	£585 0 0
W. Coates	817	0	0	White & Sons	580 0 0
T. Linfield	756	0	0	J. G. Chapman	545 0 0
J. P. Minty	737	0	0	Asplands & Co., 2, Stafford-st., Peckham*	479 5 6
Henry Brown	705	0	0	Ashmole & Grant	467 10 0
T. F. Smith	693	10	0		
G. T. Godfrey	675	0	0		
Walter Scott	640	0	0		

*Accepted.

LONDON.—Accepted at a schedule of prices for re-paving portions of Farringdon-road, for the Clerkenwell Vestry:—
J. Mowlem & Co., Grosvenor Wharf, Millbank.

LONDON.—For alterations and repairs at the "Sir Robert Peel," Bishopsgate-street:—

Antill	£510	C. Russell	£382
H. J. Williams	475	E. A. Jones	370

LONDON.—For building shop and chambers, Highgate. Mr. H. Ellis, F.S.I., architect and surveyor, Chancery-lane. Quantities supplied:—

Johnson & Co.	£2,067	Cruwys	£1,821
Southgate	1,865	McCormick	1,773
Lown Son	1,825	Carey	1,540

LONDON.—For internal finishings, panellings, &c., to No. 22 Old Queen-street, Westminster, for Mr. Leo Schuster. Mr. A. William West, architect, 44B, Maddox-street, W. Quantities by Messrs. Dunk & Bousfield, Billiter-square Buildings, E.C.:—

Turner, Lord, & Co.	£1,411 7 6	Litchfield	£1,154 14 7
		Holland & Hannen	1,090 0 0

LYMINGE (Kent).—For the erection of lodge, administrative buildings, kitchens, dining hall, chapel, &c., the Workhouse, East End Hill, for the Elham Union Guardians. Mr. Joseph Gardner, 2, Cheriton-place, Folkestone, and Mr. John Ladds, 7, Doughty-street, W.C., joint architects. Quantities by Mr. Thomas Ladds and Mr. Alfred Boxall:—

Amos & Ford	£19,263	P. Peters & Son	£16,199
R. Webster	19,100	Girling & Coe	16,105
W. & F. Denne	16,676	G. H. Denne & Son	15,940
Hayward & Paramor	16,557	Herbert Stiff	15,935
Willmott & Sons	16,445	Wallis & Son, Maidstone*	15,764
T. L. Fearow	16,277		

* Accepted.

MADRON (Cornwall).—For alterations, &c., to Bible Christian Chapel building, Heamoor, Mr. J. Wm. Trounson, architect, 27, Clarence-street, Penzance:—

Jno. Liggo	£249 0 0	James Nicholls	£227 10 0
Wm. Dustow	236 0 0	Laver & Roberts	214 15 9
Jas. Olivey	208 0 0		

None as yet accepted. The tenders were forwarded to the General Chapel Trust Committee in London, who refuse to sanction such a sum to be spent on alterations. The architect has now instructions to "report" on a new building.

MOUNTAIN ASH (Glam.).—For levelling and channelling Dover-street, for the Urban District Council of Mountain Ash. Mr. John Williams, Surveyor, Town Hall, Mountain Ash. Quantities by Surveyor:—

Williams Bros.	£133 8 0	John John, Mountain Ash (accepted)	£105 8 11
Evan Davies	122 5 11	Barnes, Chaplin, & Co.	102 3 7

NEWBURY.—Accepted for rebuilding business premises, No. 40 Northbrook-street, Newbury, for Mr. J. James:—
E. C. James, Newbury £649

NEWTOWN (Montgomeryshire).—For new factory for Messrs. Pryce Jones, Limited. (Contract No. 1). Mr. George Hornblower, architect, 22, Fitzroy-street, W. Quantities by the architect:—

Foster & Dicksee	£10,750 0 0	Aaron Watkin	£8,847 19 10
Treasure & Son	9,193 0 0	E. Davies & Son*	8,750 0 0

* Accepted.

NORMANTON (Yorks.).—Accepted for additions, &c., to the Wood House Schools, for the School Board. Mr. Wm. Watson, architect, Barstow-square, Wakefield:—

Excavating, Brick, Stone, Slating, Plastering, Plumbing, Glazing, Ironwork, and Painting.—James Bramham	£257 0
Carpentry and Joinery.—Fred Denison	74 5

NORMANTON.—Accepted for additions to school buildings, Normanton Common, for the School Board. Mr. Wm. Watson architect, Barstow-square, Wakefield:—
All the Work.—James Bramham £654 10

NORTHAMPTON.—For the erection of school buildings, Cogenhoe, for the School Board. Mr. H. H. Dyer, architect, 1, Sheep-street, Northampton. Quantities by the architect:—

G. W. Souster	£1,517	5		W. Throssel	£1,180 0
C. W. Abbott	1,465	0		Wilford & Judkin	1,152 0
G. J. Fisher	1,444	0		F. Johnson & Son	1,147 0
W. Sturgess & Sons	1,399	0		W. T. Whitbread	1,134 10
H. Martin	1,389	0		J. M. Panting	1,134 10
G. Bransom & Son	1,355	0		N. Adams	1,130 0
M. Clayson	1,350	0		J. C. Sharman, Cogenhoe*	1,174 15
E. D. Sharman	1,320	0			
A. P. Hawtin	1,300	0			

* Accepted subject to the approval of the Education Department.

NOTTINGHAM.—For laying concrete floor and making alterations at premises in Roden-street, for Messrs. Combe & Co., Ltd. Mr. W. D. Pratt, architect, Long-row, Nottingham. Quantities by architect:—

J. G. Thomas	£380	0	0	R. Fisher	£359 17 6
Wilkinson & Co.	361	0	0	R. Simpson	350 0 0
G. T. Lovett	360	0	0	J. Attenborrow	229 0 0
F. Messom	323	0	0	F. Evans, Basford, Nottingham*	220 10 0
Gilbert & Gabbitas	290	0	0	J. Fields	196 8 8
A. G. Bell	286	0	0		
T. Barlow	263	8	7		

* Accepted.

ODIHAM (Hants).—For the erection of school buildings for the Greywell School Board. Mr. J. A. Eggar, architect, Farnham. Quantities by the architect:—

E. Hellis	£1,550	0	0	Jenkins & Sons	£1,266 0 0
Poole & Son	1,490	0	0	J. Cooper	1,250 0 0
McCarthy E. Fitt	1,387	0	0	W. J. Chinchen	1,220 0 0
J. Kemp	1,341	16	4	J. Sims	1,195 13 0
Liming Bros.	1,300	0	0	J. Thumwood, Basingstoke*	1,159 11 6
Musselwhite & Son	1,295	0	0		

* Accepted.

ONGAR (Essex).—For additions to Union Workhouse, for the Union Guardians. Mr. R. Mawhood, architect, Chelmsford:—

H. Farrow	£152	10	0
Noble	148	7	1
Barlow, Ongar*	£143	1	6

* Accepted.

PENNINGTON.—For the erection of Parish Room and Offices, for the Parish Council. Mr. Boyd, architect, Rosside, near Ulverston:—

Excavating, Building, Bricklaying, Slating and Masonry.—James Grice, Hartley-street, Ulverston	£211 16
Joinery.—James Bateman, Swarthmoor, near Ulverston	124 7
Plastering.—Peter Burns, Oxford-Street, Ulverston	24 0
Painting, Plumbing, and Glazing.—Thomas Braithwaite, Prince's-street, Ulverston	14 0
Total	£374 3

PONTYPRIDD.—For the erection of a chapel, for the Wesleyan Trustees. Mr. Arthur O. Evans, architect, Pontypridd:—

Charles Cope	£6,226	0	0	D. C. Jones & Co.	£5,677 0 0
Perkins, Parsons, & Co.	5,986	0	0	Williams & James	5,599 3 9
Evan Williams	5,945	0	0	A. J. Colbourne	5,599 19 10
Watkin Williams	5,866	0	0	Knox & Wells, Cardiff (accepted)	5,189 0 0
M. Julian	5,744	0	0		

ST. IVES (Cornwall).—For the construction of 5,270 yds. sewers, with manholes, &c., for the Corporation. Mr. Edward Cousins, C.E., Palace Chambers, Westminster, S.W.:—

W. C. Shaddock	£10,915	5	10	J. Shaddock	£7,123 14 2
T. Shaddock	10,535	9	3	W. H. Thomas & Son	6,503 16 10
G. Duke	7,680	17	1	Lang, Liskeard*	6,102 11 4
W. H. Perry	7,283	1	4		
R. Joy	7,129	3	11		

* Accepted.

SHERBORNE (Dorset).—For cottage residence for waterman, at the Pumping Station, for the Sherborne Urban District Council. Mr. Thos. Farrall, architect:—

A. Betton	£280	10	0	Gillingham & Croft, Sherborne*	£274 5 0

* Accepted.

STAINES.—For the erection of buildings, Kingston-road, for the Staines and Egham Co-operative Society. Mr. Ralph Fitt, architect, Staines. No quantities:—

Robinson & Francis	£1,149			J. Chapman	£1,075
G. Reavell, Staines*	1,128			W. Satchwell	1,030

* Accepted.

STRATFORD.—For alterations and additions to Nos. 46, 48, and 50, Broadway, Stratford, for Messrs. Williams & Thomas. Mr. F. J. Sturdy, architect, 44, Finsbury-pavement, London, E.C.:—

Gladding	£1,158	Bishop & Webb	£876
Hosking	957	Norton	830
Faulkner	933		

TWICKENHAM.—For the supply of 800 tons Guernsey granite spalls, for the Urban District Council. Mr. G. B. Laffan, Surveyor, 91, Queen's-road, Twickenham:—

— Cooper, Bros.	12 0	G. Le Maitre	9 0
J. Mowlem & Co.	10 6	R. L. & J. Fennings, Wellington Chambers, London-bridge*	8 9
Wm. Griffiths	10 0		
A. & F. Manuelle	9 10		

* Accepted.

TWICKENHAM.—For the supply of 1,500 yards of broken Kentish pit-flints, for the Urban District Council. Mr. G. B. Laffan, Surveyor, 91, Queen's-road, Twickenham:—

	Per yd. s. d.		Per yd. s. d.
Wm. Clark	6 1	H. Eastwood	4 9
Wm. Chapman	5 5	A. J. Knight	4 9
G. Pearce	5 0	J. Horsford, Dare, near Faversham (accepted)	4 9
H. Dally	4 10		

WAKEFIELD.—Accepted for road-making and sewering, near Balne-lane, Wakefield. Mr. W. Watson, architect:—
J. & G. Wilson £204 16

WALLINGFORD (Berkshire).—Accepted for stables and entrance-gates (exclusive of stable fittings, pavings, drainage, &c.), for Mr. F. Sweetland. Mr. George Hornblower, architect, 20, Fitzroy-street, W.:—
Brasher & Sons £737 9

WARRINGTON.—For forming and paving Hanover-street and others, for the Council. Mr. Thomas Longdin, Borough Surveyor, Town Hall, Warrington:—

Hanover-street.

Thos. Stringer £279 2 7

Passage behind 133 to 149, Orford-lane.

Thos. Stringer £62 5 11

Scott-street.

F. T. Bennie £249 10 7

Passage from Battersby-lane to Stevenson-street.

Wm. Heaton £12 13 4

[All of Warrington.]

WELLINGBOROUGH.—For the erection of a retaining wall, Debdale, Hardwick-road, for the Urban District Council. Mr. Edward Sharman, Surveyor, Market-square, Wellingborough. Quantities by Mr. C. Archer:—

G. A. Smith	£235 0	W. Stevens	£142 0
R. Sidebottom	218 5	E. Brown & Son,	
R. Marriott	158 0	Wellingborough *	124 10
Hacksley Bros.	146 0	* Accepted.	

WEST HAM.—For erecting St. Matthew's Church and Parochial Hall, St. Matthew's Park, West Ham, for the Rev. R. Arnold Pelly. Mr. H. P. Loftus Brock, F.S.A., architect:—

	Church.	Hall.
Mattock Bros.	£4,284	£691
A. Reed & Son	4,187	677
J. Allen & Sons	4,050	625
F. G. Minter	4,000	655
W. Watson	4,000	628
S. J. Scott	3,927	614
J. Smith & Son	3,860	635
S. G. Parmenter	3,814	632
Chas. North (withdrawn)	3,559	600

WEST HOATHEY (Sussex).—Accepted for repairs and additions to house, Birch Grove. Mr. R. Mawhood, architect:—

W. Baker, Danbury, Essex £297 10

YEOVIL.—For supplying and laying 2,000 yards stoneware pipe sewer, for the Rural District Council. Mr. Thomas Farrall, engineer, Sherborne, Dorset:—

W. Guyatt, Zeals, Mere, Wilts. £733

Accepted.

Several others tendered.

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NOTE.—**The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.**

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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***Registered Telegraphic Address*, 'THE BUILDER,' LONDON.**

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******* Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed), 1s.

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LASCELLES' CONCRETE

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CHURCH BENCHES & PULPITS.

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FOR ALL THE PROVED KINDS OF

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FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

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London Agent:

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The attention of Architects is specially invited to the durability and beautiful COLOUR of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. Address, The Ham Hill Stone Co., Norton, Stoke-under-Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADVT.

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EUREKA GREEN SLATES.

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SURE PREVENTATIVE OF RUST ON ALL KINDS OF IRON, STEEL, AND OTHER METALS,

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FINEST MATERIAL FOR PRODUCING ENAMEL PAINTS.

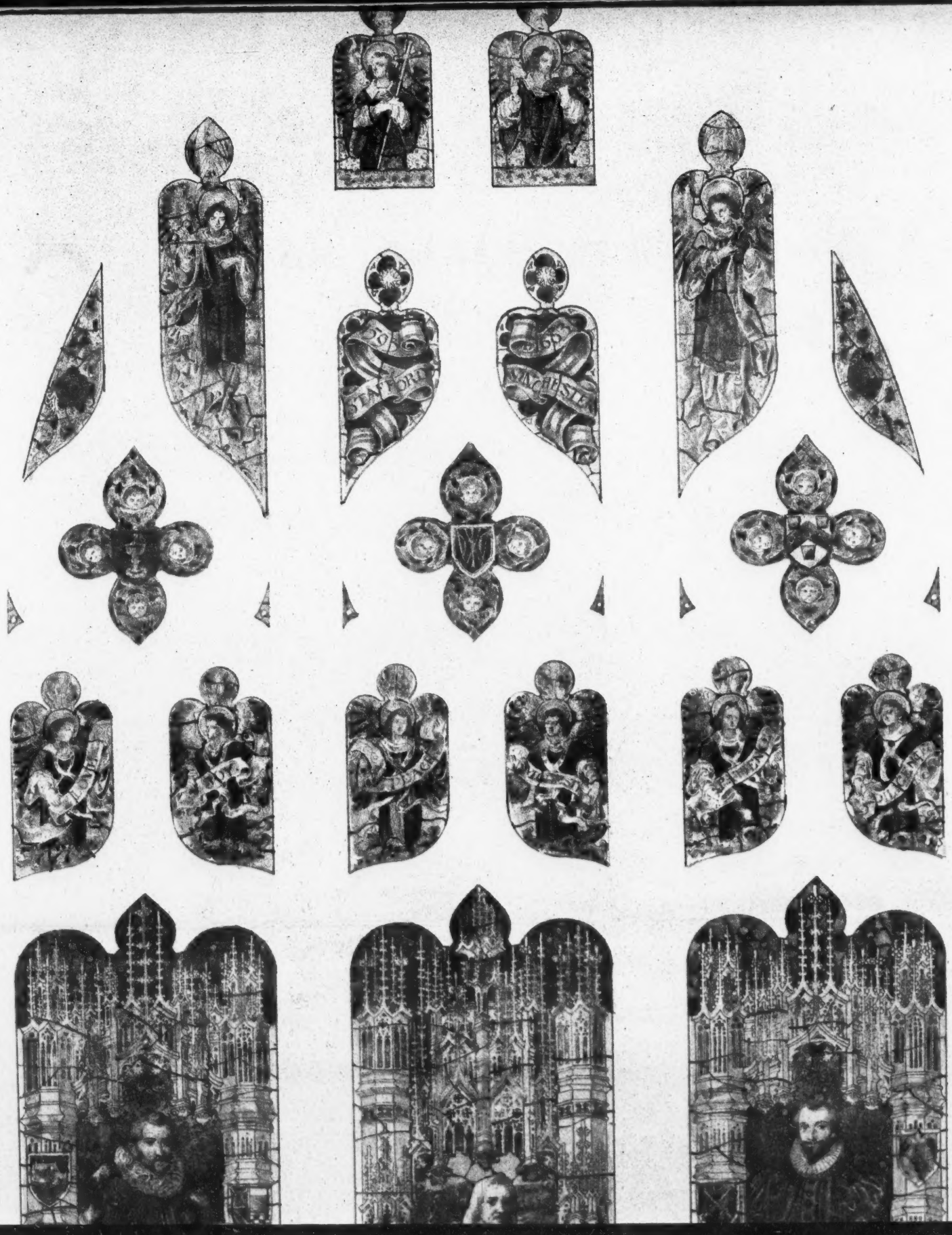
Used by all the leading Railway Companies, Iron Founders, Machine Makers, &c., mixed with Paint, or on Paint, for Iron Bridges, Girders, &c., also on Wood Painted with Carbolineum.

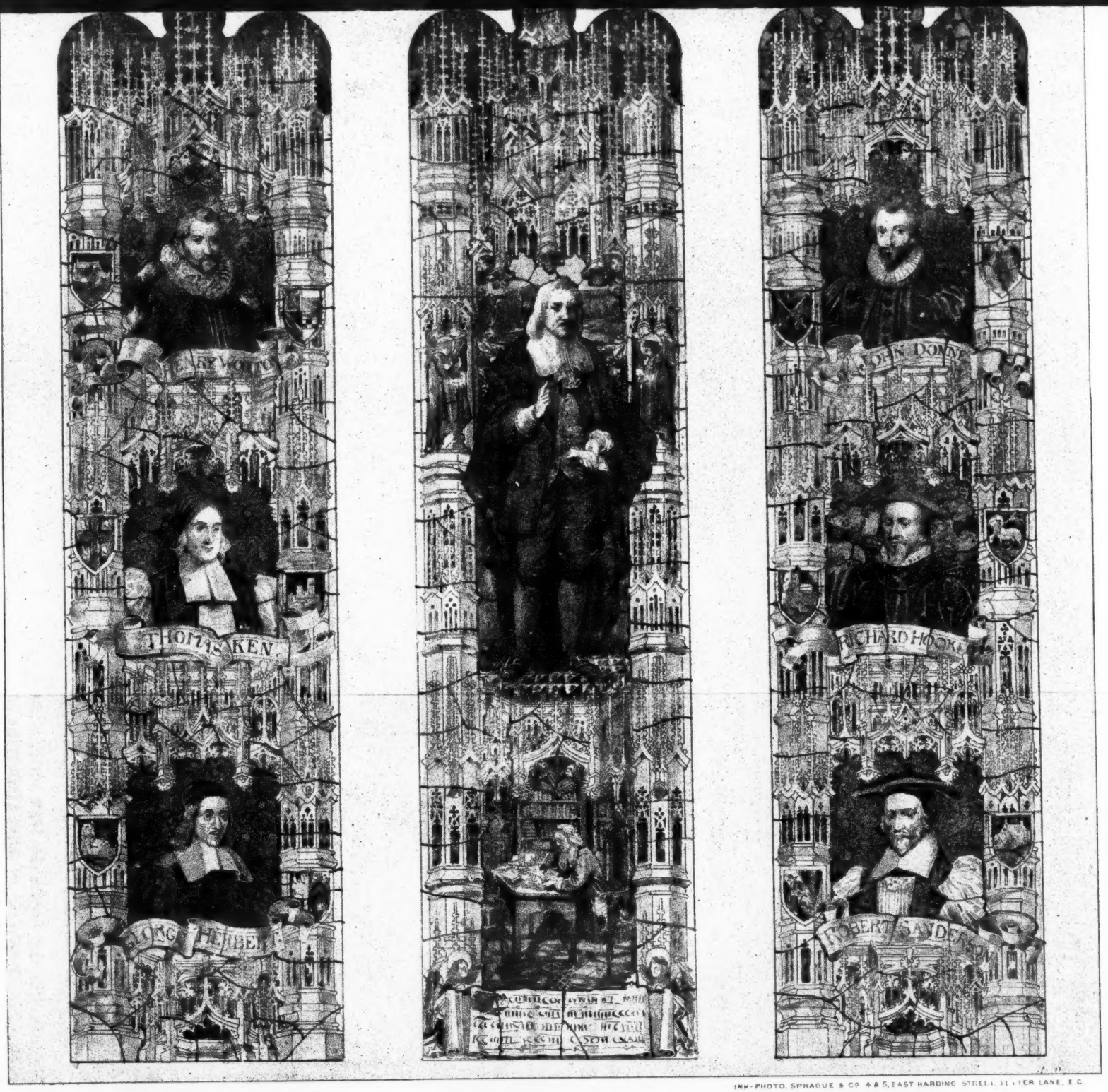
INDESTRUCTIBLE COMBINATION WASHERS,

For Flange Joints of Steam and Water Pipes, tested up to 2,300 lbs. pressure.

These Washers consist of rings of soft metal, grooved outside, and holding in the groove packing material, such as Asbestos, Rubber, Hemp, &c., &c. The soft metal, in conjunction with the packing included, will accommodate itself readily to any unevenness in unplaned flanges, and make a perfect and durable joint. It is impossible, owing to their construction, to blow them out under any pressure whatever.

PETERS, BARTSCH, & CO., DERBY. London Office, 68, QUEEN STREET, CHEAPSIDE, E.C.





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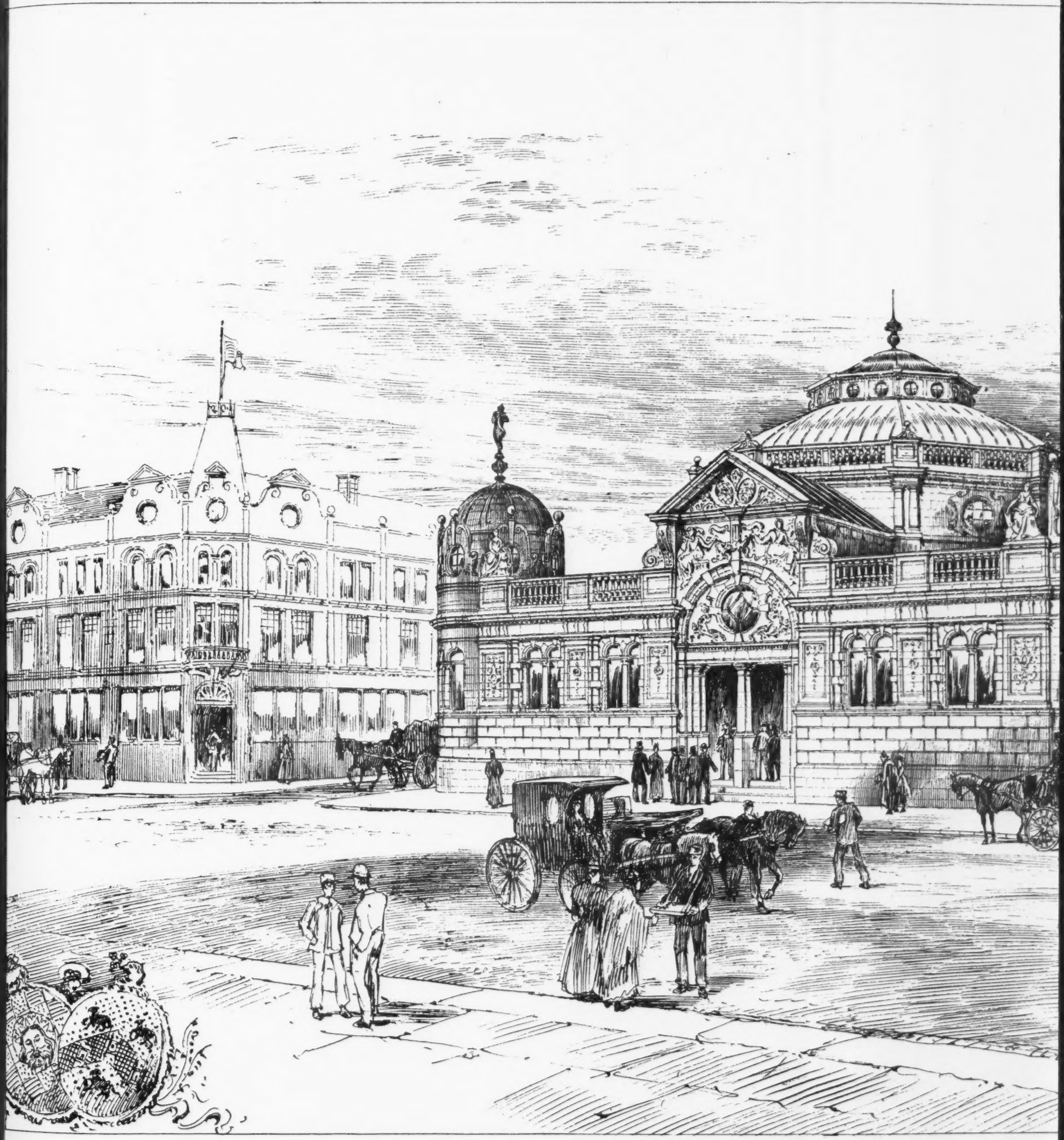
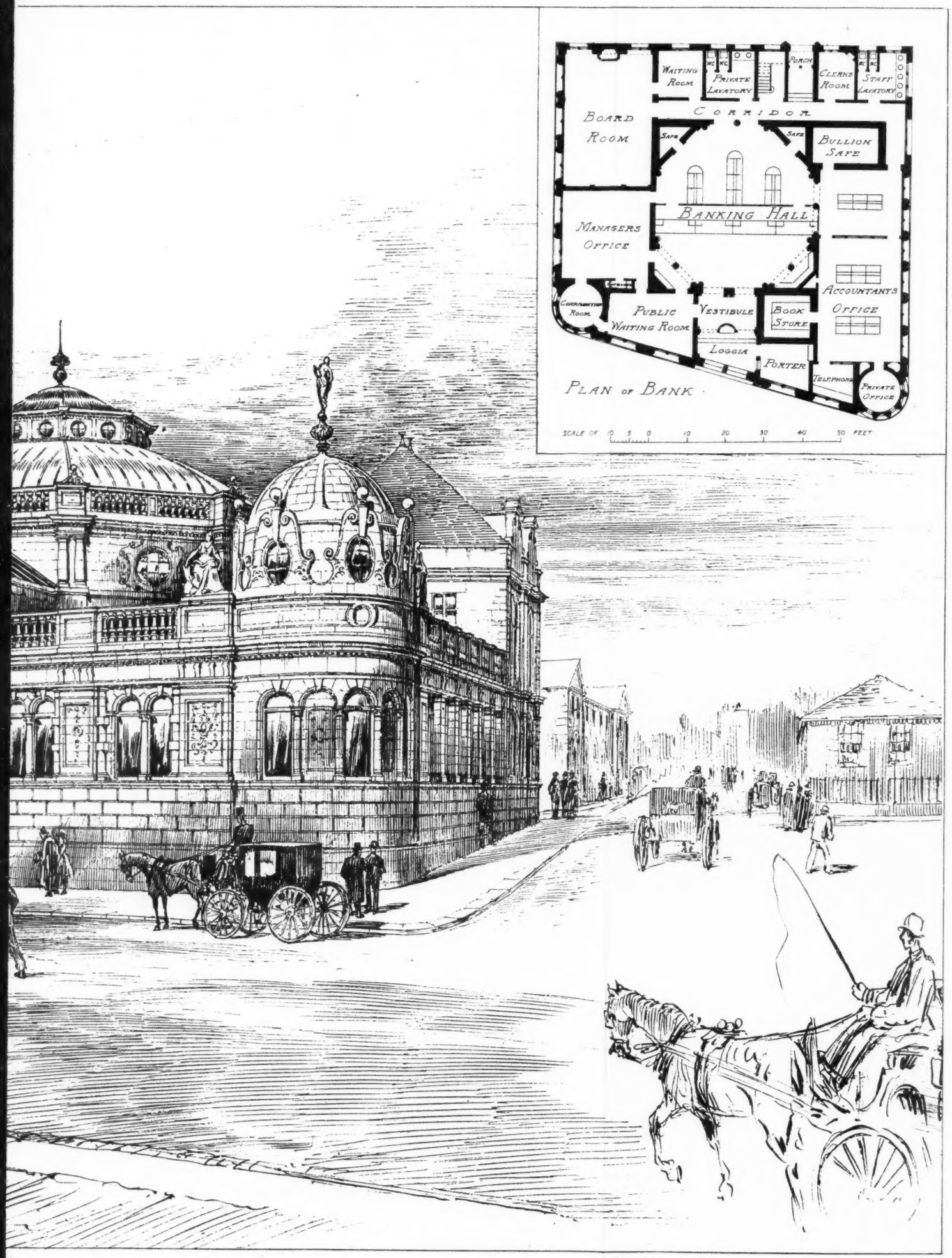
By Messrs. Percy Bacon & Brothers.



COMPETITION DESIGN FOR PROPOSED BANK, HALIFAX.—By Mr. Herbe



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The Dukes Mansion

Opposite The British Museum. Nos 50 to 61 Great Russell Street. Bloom

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C. F. Hayward Archt

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"ABBOT'S LEIGH," NEAR HAYWARD'S HEATH: GARDEN FRONT.—Mr. F. C. Lees, Architect.

—A House at Rudgwick · Sussex ·—

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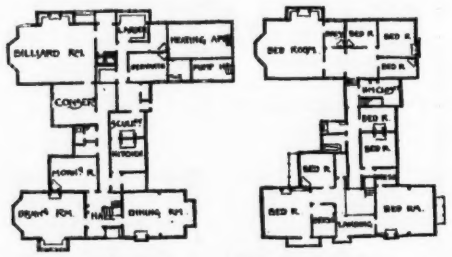
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